Identifying Gap, Challenges and Opportunities in Prescribed Fire Efforts within the Southeastern U.S.

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Abstract

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Resource management agencies in the southeast region seek to successfully implement prescribed fire across all landscapes, including private lands. The Southeast Regional Strategy Committee and the Southeast Regional Partnership for Planning and Sustainability (SERPPAS) Prescribed Fire Work Group have established benchmark goals and actions directed to prescribed fire implementation across the region. Yet, there is limited understanding of the progress of goals and actions due to the lack of a systematic evaluation related to the aforementioned frameworks. Understanding current gaps is limited and no attempt has been made thus far to systematically document efforts made toward implementing these strategies. This study used data collected through an environmental scan and key informant interviews to understand the current state of the established goals and actions along with regional impediments affecting their implementation. The results of this study will identify gaps impeding prescribed fire efforts and provide useful recommendations from key informants to overcome these gaps throughout the region.

Contents

List of Tables

List of Figures

List of Appendices

1. Introduction

Widespread efforts across the Southeast are being made to increase prescribed fire use to meet land management objectives that support restoration and enhancement of fire dependent ecosystems, reduce wildfire risk, and promote active land management needed for both economic and biological value. Longleaf pine is a fire-dependent species that when managed properly with prescribed fire not only helps restore longleaf ecosystems, but yields associated benefits such as reducing the risk of catastrophic wildfire, thereby protecting air quality, and improving wildlife habitat for game, at-risk, and endangered species. Such benefits enhance natural, economic, and human resources, as well as national security.

Prescribed fire goals are currently impeded by liability concerns, lack of capacity, financial constraints, perceptions, land use change, challenges in coordination and collaboration, and more (Burke, Steelman, & Serenari, 2012b). To address the issues surrounding the impediments to prescribed burning in the Southeast, significant efforts are needed to resolve each of the above concerns. Reaching non-industrial private landowners, corporate landowners, and other agencies that have the ability to impact and support prescribed fire goals will be essential in moving forward (Burke, Steelman, & Gharis, 2012a).

The purpose of this study is to assess the impact of the current programs and resources across the Southeast for addressing the needs and goals outlined in the "National Cohesive Wildland Fire Management Strategy" and the "Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine in the Southeast United States." Although the needs have been assessed and goals have been set, it is unknown if the Southeast is on trajectory to meet these goals. A gap analysis will help the Southeastern prescribed fire community to determine progress towards accomplishing these goals as well as identify areas that may need more focus. The results of this study are intended to support collaboration and coordination among agencies and organizations already involved in prescribed fire implementation, as well as encourage active management among landowners.

1.1 National Wildland Cohesive Management Strategy and the Southeast Regional Action Plan

The National Wildland Cohesive Management Strategy (Cohesive Strategy) is a three-phase, multidimensional effort to collaboratively address wildland fire management challenges across all lands and jurisdictions. The Cohesive Strategy represents the first time all stakeholders involved in wildfire and land management have had the opportunity to come together and create a shared national fire strategy. It also represents the first time individual regions have been able to identify regional goals, objectives and challenges for assimilation into a national strategy (SRSC, 2013).

The Southeast has a tradition of collaboration, much of this due to the fact that nearly 90% of the land base in the region is in private ownership. The Southeast developed a Regional Strategy and Assessment based on the region's unique values, opportunities and challenges. Early in the planning process, values important to stakeholders across the region were identified that included firefighter and public safety, marketable products, ecological services, cultural values and property protection (SRSC. 2013). Working with partners and cooperators, and including input from wildland fire organizations, land managers and policy-making officials representing all levels of governmental and non-governmental organizations, the Southeast Regional Strategy Committee (RSC) selected the same three national goals to be the region's goals (SRSC, 2013). Listed below are the goals of the Southeast that recognize the most significant fire-related challenges and opportunities for positive change (SRSC, 2013):

- Restore and Maintain Landscapes – Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives
- Fire Adapted Human Communities – Human populations and infrastructure can withstand wildfire without loss of life or property
- Response to Fire – All jurisdictions participate in developing and implementing safe, effective and efficient risk-based wildfire management decisions

The Southeast Regional Action Plan (SERAP) details the goals, strategies, actions, desired outcomes and prioritized implementation tasks for the Southeast Cohesive Strategy. SERAP represents the roadmap for the implementation of the Cohesive Strategy in the Southeast. The action plan included eight cross value actions that were identified as having the

potential for the greatest positive impact across regional values and goals identified during the Cohesive Strategy development. The actions include (SRSC, 2013):

- Use education and incentive programs to encourage new and nontraditional private landowners to manage their lands to contribute to resiliency while providing forest products and expanding ecosystem markets.
- Encourage planning efforts across landscapes between practitioners and land managers to address wildland fire, landscape resiliency and community safety while balancing other concerns and emphasizing plan development in high risk areas.
- Work with regulatory agencies and entities (i.e., air quality) to ensure that prescribed fire remains a viable management tool and maximize flexibility for its use (including liability issues).
- Encourage greater public smoke awareness through outreach and understanding.
- Control invasive species that alter fire regimes and ecosystem function.
- Support efforts to increase prescribed burning for ecosystem restoration.
- Utilize prioritization in Southern Wildfire Risk Assessment (SWRA) and other efforts to identify and treat wildland fuels that would create tactical fuel breaks and facilitate defense of human communities or ecological values and services from wildfire.
- Increase community preparedness and mobilization abilities (e.g., evacuation) and increase coordination and planning between local, state, and federal responders prior to wildfire ignition.

Within each of these broad action items, the action plan identifies specific actions that must be taken to meet the needs of the wildland fire management community in the Southeast. The list is intended to be a starting point for collaboration and conversation among wildland fire management stakeholders across the region. These actions are seen as necessary steps that will enable the Southeast Region to make progress in achieving the overarching national goals: Restore and Maintain Landscapes, Fire-adapted Communities and Response to Fire. The SERAP contains 43 recommended actions, 14 of which are directly related to prescribed fire.

1.2 Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine in the Southeast United States: Southeast Regional Partnership for Planning and Sustainability (SERPPAS)

In the fall of 2011, The Southeast Regional Partnership for Planning and Sustainability (SERPPAS) established a Prescribed Fire Work Group to synthesize current knowledge about barriers and alternatives related to prescribed fire in the Southeast, and to craft a Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine. The Synthesis Report: Current Work on Prescribed Fire Related to Longleaf Pine Restoration uncovered numerous and interrelated challenges that are deterring wider application of prescribed fire in the nine-state historic longleaf pine range (Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas). These include (Burke et al., 2012b):

● Lack of adequately funded, appropriately incentivized programs or private markets that support prescribed burning practitioners and landowners

● Gaps in information dissemination and marketing efforts to key stakeholder groups and the general public

● Lack of qualified, experienced prescribed burning practitioners, burn training, and services

● Legal and practical uncertainties creating a risk averse environment

● Inconsistent smoke management programs and guidelines across the nine states and uncertainty related to air quality limitations on burning

● Lack of adequate information and decision support structures to inform smoke emissions, air quality, and other decisions

● Lack of coordination and fragmented approaches across federal, state, local agencies

The synthesis provided the SERPPAS Prescribed Fire Work Group with a comprehensive understanding of the current state of prescribed burning in the Southeast, and the challenges to be overcome to increase prescribed fire. Additionally, strategic priorities were developed to increase capacity to apply prescribed fire in longleaf ecosystems with input from Work Group members and others in the fire, air quality, and longleaf communities to assess stakeholder priorities and available resources to develop and implement a prescribed fire strategy.

Following the synthesis report, efforts began to develop The Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine in the Southeast United States. The strategy was written

for professionals in the fire community, representing agencies and organizations whose active involvement in directing policy and implementing programs is essential to achieve the goals of the Strategy (Burke et al., 2013a). Developed in a context of growing recognition for the importance of and need for prescribed fire, the Prescribed Fire Strategy is intended to work in concert with other efforts, and to encourage more cohesive and coordinated action among relevant agencies and organizations. The strategy includes goals and activities that would expand private landowners' ability to burn, particularly in Significant Geographic Areas for longleaf pine. (Burke et al., 2012a)

The Prescribed Fire Strategy represents a consensus among representatives of federal and state agencies, non-governmental organizations, academic institutions, and the private sector. It focuses on achieving the goals of the Range-wide Conservation Plan for Longleaf Pine, which calls for increasing longleaf pine acres from 3.4 million to 8 million by 2025 (ALRI, 2014). Of that 4.6 million increase, 3.4 million acres will be on private land and 1.2 million acres will be on public land (ALRI, 2014). The vision of the Prescribed Fire Strategy is to have region-wide application of prescribed fire at the scale and frequency needed to establish the additional acres of longleaf pine on private lands by the year 2025, while supporting continued longleaf conservation by public land managers. The following eight goals are set as benchmarks to achieve the vision (Burke et al., 2012a):

- Ensure sufficient, consistently available resources to promote and implement increased prescribed fire operations.
- Implement focused, effective communication, and education campaigns to increase awareness of prescribed fire and willingness to burn.
- Increase the number of trained, qualified and experienced burners (both landowners and contractors) conducting prescribed burning on private and public lands.
- Minimize landowners' risk of liability associated with prescribed fire.
- Support prescribed fire programs on public lands.
- Minimize local smoke impacts on air quality and public health and safety. Maximize coordination between air and fire communities.
- Implement a consistent fire activity and emissions tracking system across the Southeast that is accessible to public and private burners.

- Ensure coordination and collaboration at the regional, state, and local levels to implement the prescribed fire strategy.

The Strategy describes regional, state, and local activities that need to be accomplished in the short-term to make progress toward achieving the goals by 2025. Additionally, it emphasizes the importance of leveraging the numerous funding sources, organizations, and networks, as well as identifying existing prescribed fire tools and models to maximize efficiency and success.

2. Methods

An evaluation was conducted utilizing the strategic gap analysis framework. The intention of this framework is to outline the current state of prescribed fire efforts in relation to the desired state. This allows for the formulation of meaningful recommendations to bridge gaps among the areas of interest within the 13 states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, Puerto Rico and US Virgin Isles. This area of interest was selected based on its large geographic range discussed within National Wildland Cohesive Management Strategy, providing a larger area for evaluation. For the purpose of this study, the "National Wildland Cohesive Management Strategy and the Southeast Regional Action Plan" (SERAP) along with the "Southeast Regional Partnership for Planning and Sustainability (SERPPAS) Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine in the Southeast United States: A Vision for 2025" (Comprehensive Prescribed Fire Strategy) serve as the foundational documents to identify the current and desired state across the southeast.

In order to understand relationships between the foundational documents and the area of interest, data collection occurred in two phases: an environmental scan and key informant interviews. The purpose of the environmental scan is to capture specific efforts being worked towards implementing the SERAP established actions and SERPPAS benchmark goals. Key informant interviews identify themes and relationships that identify current gaps. Interviews also allow professionals representing various state, federal and local agencies and organizations to suggest recommendation to address impediments relevant to the identified gaps.

An advisory committee consisting of multiple agencies and organizations (Table 1) was developed to provide recommendation for the evaluation of current programs and efforts

throughout the region. In addition to their recommendations toward the environmental scan, the committee also recommended appropriate informants to speak about their priority areas in relation to the aforementioned strategies. This group was chosen by representatives within the Southeast Regional Strategy and SERPPAS work groups. Along with identifying missing or misrepresented data, the advisory committee also served as quality assurance to validate study methods and data collection. Following collection, data was carefully synthesized to understand current efforts, identify current gaps and formulate recommendations to bridge gaps between prescribed fire impediments.

Table 1. Advisory Committee Participants consisting of various agencies and Organizations appointed by the Southeast Regional Strategy and SERPPAS Working Groups.

Gap Analysis Advisory Committee Agencies and Organizations
1. Department of Defense
2. National Park Service
3. North Carolina State University
4. Southeast Cohesive Strategy
5. Southeast Regional Extension Forestry
6. Southern Group of State Foresters
7. US Environmental Protection Agency
8. US Fish and Wildlife Service
9. US Geological Survey
10. USDA Forest Service
11. USDA Natural Resources Conservation Services

2.1 Environmental Scan

An environmental scan uses a variety of approaches to collect information used to assess the current state and expectations while promoting resources that allow appropriate strategic direction. For the purpose of this study, the environmental scan serves as a template to identify current progress being made towards implementing SERAP actions and SERPPAS goals. A detailed catalogue of prescribed fire efforts was compiled in Microsoft Office Excel by a postdoctoral research scholar, graduate student and Extension Associate to represent this progress. This catalogue provides a synthesis to better understand the current effort being made toward each SERAP action and SERPPAS goal occurring regionally and among the individual 15 states. SERAP actions were further characterized by specific tasks (i.e. Action: Task).

SERPPAS goals were further characterized by specific actions (i.e. Goal: Action). Each action and goal was further identified by state, organization type, agency, supplemental partner or committee, program area, land type, target group, description, project duration/grant type, funding source, contact and job title. Based on the environmental scan results, eight categories were established based on primary factors of fire related programs and resources at the federal, state, and local levels for both public and private sectors. These categories consisted of Financial assistance, Technical assistance, Communication, Outreach and Education, Research, Training, Administrative, Information/Technology and other.

Once the catalogue was approved by the advisory committee, the data was synthesized using a Microsoft Excel program filtering feature (Table 2). These methods were applied to SERAP, SERPPAS, individual states and the eight identified Environmental Scan categories. This filtering processes resulted in a condensed catalogue, which narrowed the focus of current efforts for the analysis.

Table 2. Microsoft Excel filtering methods used to synthesize both SERPAS and SERPPAS data sets.

Environmental Scan Catalogue Filtering Methods Within Microsoft Excel Program
In order to identify the current state of efforts toward implementing SERAP actions and SERPPAS goals, a basic Microsoft Excel Program filter method was used to identify and quantify efforts within the scan. The following steps outlines this process. **Step 1:** Perform a basic excel filter to identify and quantify individual **actions/goals** identified within the scan. **Step 2:** Perform a basic excel filter to identify and quantify individual **task/actions** for each **action/goal** identified in Step 1. **Step 3:** Enter Result from Steps 1 & 2 into a condensed catalogue **Step 4:** Perform a basic excel filter for each of the 15 states identified within the scan. **Step 5:** Apply Steps 1 & 2 for each of the 15 states. **Step 6:** Enter Results from Steps 4 & 5 into the condensed catalogue.
In order to quantify the 8 assistance categories based on primary factors of fire related programs efforts identified within the Environmental Scan, a basic Microsoft Excel Program filter method was used. The following steps outline this process. **Step 1**: Perform a basic excel filter each of the following categories.   - Financial Assistance   - Technical Assistance   - Research   - Communication, Outreach and Education   - Training   - Administrative   - Information and Technology   - Other   **Step 2**: Perform a count method for each of the filters to determine overall totals within the Scan. **Step 3:** Enter Results from Step 2 into the condensed catalogue.

2.2 Content Analysis and Key Informant Interviews

A content analysis is a qualitative research technique used to analyze textual data. For the purpose of this study, a conventional content analysis was conducted to highlight exact words from the interview responses that captured key themes and concepts occurring throughout the Southeast region. A content analysis allows researchers to gain direct information from study participants without imposing preconceived categories or theoretical perspectives (Hsieh et al.2005).

Forty-nine key informant interviews were conducted. Interview participants were recommended by the advisory committee based on their affiliation and knowledge about actions and goals within the SERAP and SERPPAS strategies. A total of 30 agencies/organizations (Appendix 1) from the Southeast region were represented by the selected informants. This method was conducted as a follow-up to the Southeast Wildland Fire Initiative Environmental scan that was initially performed.

Interviews were conducted using a semi-structured interview protocol developed to encompass the components of a gap analysis. To better understand current efforts and gaps, participants were asked a series of 5 questions (Appendix 2*)*. These questions were directed toward SERAP actions and SERPPAS goals specific to their priority areas. Interviews were recorded based on interviewee consent as a quality assurance measure to capture accurate responses and assure accurate note-taking. Each interview was transcribed into a consistent text format that closely resembled the verbal responses to undergo the content analysis. Once the interviews were consistently transcribed, each response was grouped and entered into a catalogue that categorized the response for each question. For each of the questions, broad code categories were identified. These categories were then placed in sub-groups to better capture specific themes and relationships. To prevent bias and for quality assurance, the content analysis was conducted by two graduate students at different times. The results from the key informants were then assessed to identify current gaps.

3. Results

3.1 Environmental Scan Categories

The Environmental Scan conducted among SERAP and SERPPAS efforts identified 556

programs implementing efforts toward SERAP actions and SERPPAS goals across the region. Within these 556 programs, they provide 1307 assistance categories (Appendix 3). Figure 1 identifies the eight categories and their percentages that were based on primary factors and their relation to various programs identified in the environmental scan. Category classification and their frequency can be observed in Figure 1, (*See Appendix 3. for category descriptions and overall totals).*

Figure 1. Southeastern Prescribed Fire Participation: The environmental scan identified 1307 efforts related to programs and resources at the federal, state and local levels for both public and private sectors.
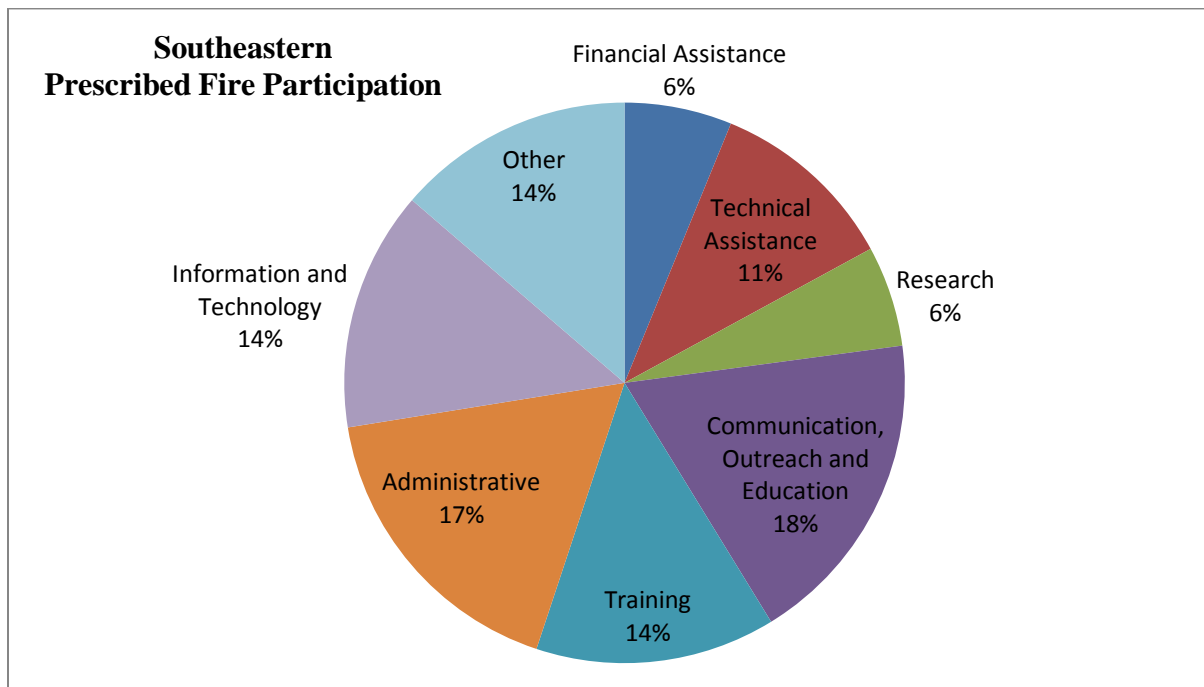
3.2 Southeast Regional Action Plan

The Environmental Scan for SERAP Actions and related task found a total of 832 efforts occurring across the southeast. The scan revealed that all 14 of the actions relating to prescribed fire were currently being worked toward through various efforts (Table 3). Indicating that 33% of the SERAP prescribed fire actions are currently being worked toward. Of the original 43 actions, 29 actions were not identified within the environmental scan, indicating that 67% of the SERAP prescribed fire tasks remains to be completed. These totals can be referenced in Table 3. A complete summary of identified actions versus unidentified actions and their associated task addressing prescribed fire can be referenced in *Appendix 4.* For additional information regarding SERAP actions and action task, reference the *Southeast Regional Action Plan*: *The National Cohesive Wildland Fire Management Strategy: Phase III.*

Table 3. Outline of the current state of SERAP actions identified within the Environmental Scan.

Action	Total	Percent of Total Efforts
3.A	282	34%
6.F	156	19%
0.B	113	14%
6.G	96	12%
2.D	45	5%
6.C	36	4%
5.C	22	3%
6.A	18	2%
7.D	18	2%
4.E	17	2%
6.D	11	1%
2.A	9	1%
7.A	6	1%
6.E	3	0.36%
Overall Total Effort	**832**	

In order to understand individual state efforts toward the total 832 efforts being made across the southeast, the 15 states and territories were reviewed. All 15 states were identified as currently working toward implementing one or more actions identified within the environmental scan (Table 4).

Table 4. Outline of the current state of SERAP actions among the individual states and territories within United States Department of Agriculture (USDA) Forest Service Region 8.

STATE	Total	Percent of Total Efforts
Regional	149	18%
North Carolina	87	10%
Florida	74	9%
Georgia	70	8%
Texas	67	8%
Alabama	62	7%
South Carolina	52	6%
Oklahoma	49	6%
Arkansas	44	5%
Mississippi	44	5%
Tennessee	37	4%
Virginia	34	4%
Louisiana	30	4%
Kentucky	26	3%
Puerto Rico	6	0.7%
US Virgin Islands	1	0.1%
Overall Total Effort	**832**	

3.3 SERPPAS Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine n the Southeast United States

The *Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine in the Southeast United States* set eight goals as benchmarks to achieve restoration efforts across the southeast, as well as 48 specific actions within those goals. The Environmental Scan identified 471 efforts being made to implement, to some degree, all eight goals of the strategy. The environmental scan found at 54% of efforts were working towards implementing the 48 actions items. However, 46% of the actions associated with the goals remain to be implemented (Table 5). A complete summary of identified goal versus unidentified goals and their descriptions can referenced in *Appendix 5*. For additional information regarding SERPPAS goals and actions, reference the *Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine in the Southeast United States: A vision for 2025.*

Table 5. Efforts made towards implementing the eight SERPPAS goals as identified within the Environmental Scan.

Action	Total	Percent of Total Efforts
2	184	39%
5	120	25%
1	75	16%
3	49	10%
6	21	4%
4	19	4%
8	2	0.4%
7	1	0.2%
Overall Total Effort	**471**	

In order to understand individual state efforts toward the total 471 efforts being made across the southeast, the 15 southern states and territories were reviewed. Every established goal is not conducive for all 15 states due to their geographic location. For example, states identified as having no effort towards implementing one or more of the eight benchmark goals, are located outside of the native Longleaf Pine range. Therefore, only nine of the 15 states were identified in the environmental scan as currently working toward implementing one or more goals since there are nine states in the longleaf range (Table 6).

Table 6. Efforts made towards implementing the eight SERPPAS goals among the individual states and territories within United States Department of Agriculture (USDA) Forest Service Region 8**.**

STATE	Total	Percent of Total Efforts
Regional	126	27%
Florida	51	11%
Texas	47	10%
Georgia	44	9%
North Carolina	44	9%
Alabama	41	9%
Mississippi	37	8%
South Carolina	34	7%
Louisiana	26	6%
Virginia	21	4%
Arkansas	0	0%
Kentucky	0	0%
Oklahoma	0	0%
Puerto Rico	0	0%
Tennessee	0	0%
US Virgin Islands	0	0%
Overall Total Effort	**471**	

3.4 Key Informant Interviews

Interviews were conducted with 51 professionals representing 31 agencies and organizations throughout the Southeast region (Appendix 1). Many participants were able to address multiple actions and goals across both SERAP and SERPPAS strategies. Table 7 below outlines the overlap within informant priority areas and illustrates the number of SERAP actions and SERPPAS goals addressed.

Table 7. Summary of Key Informant Interviews addressing both SERAP actions and SERPPAS goals across priority areas.

Strategy Type	SERAP	SERPPAS
Number of Informants	41	28
Number of Agencies Represented	22	21
Number of Actions/ Goals Addressed	14	8
Number of Attributing Task or Actions Addressed	39	48

The content analysis of the interviews identified 12 emergent categories that represented key gaps limiting effective implementation of SERAP actions and SERPPAS goals across the region. These categories and their frequency can be referenced in Figure 2 (SERAP) and Figure 3 (SERPPAS). In order to understand potential solutions to the identified gaps, the content analysis was applied to the key informant recommendations, resulting in a total of nine categories. These categories and their frequency can be referenced in Figure 4 (SERAP) and Figure 5 (SERPPAS).

Figure 2. Gaps in the current implementation of the *Southeast Regional Action Plan (SERAP)* as identified through a content analysis of the interviews

Figure 3. Gaps in the current implementation of the *Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine in the Southeast United State (SERPPAS)* as identified through a content analysis of the interviews.
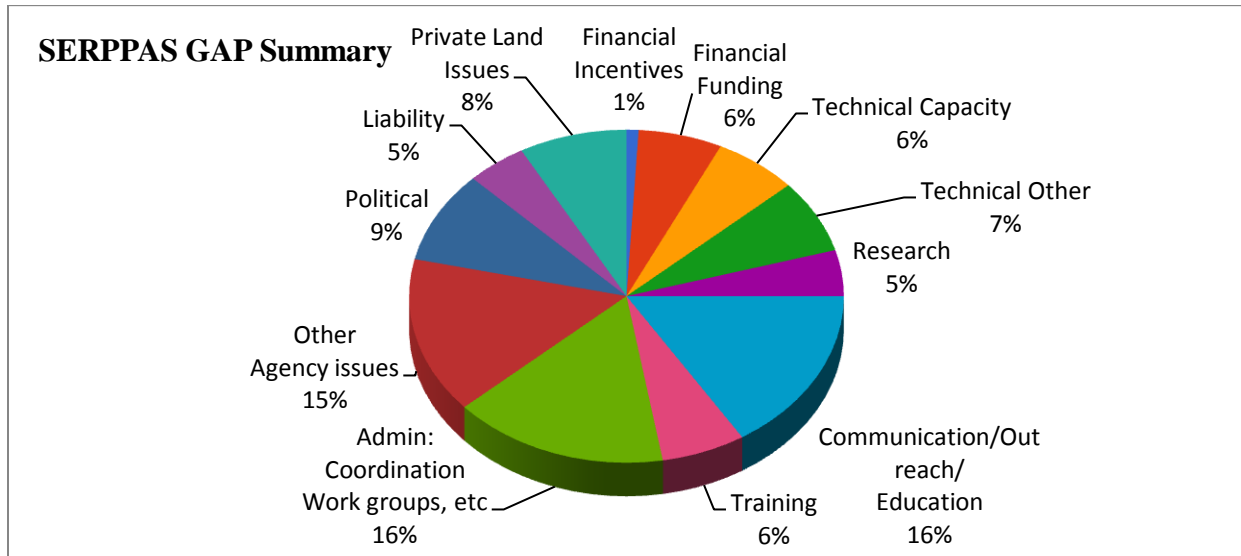
Figure 4. Recommendations from the interviews to address identified gaps with the current implementation of the *National Wildland Cohesive Management Strategy and the Southeast Regional Action Plan (SERAP).*

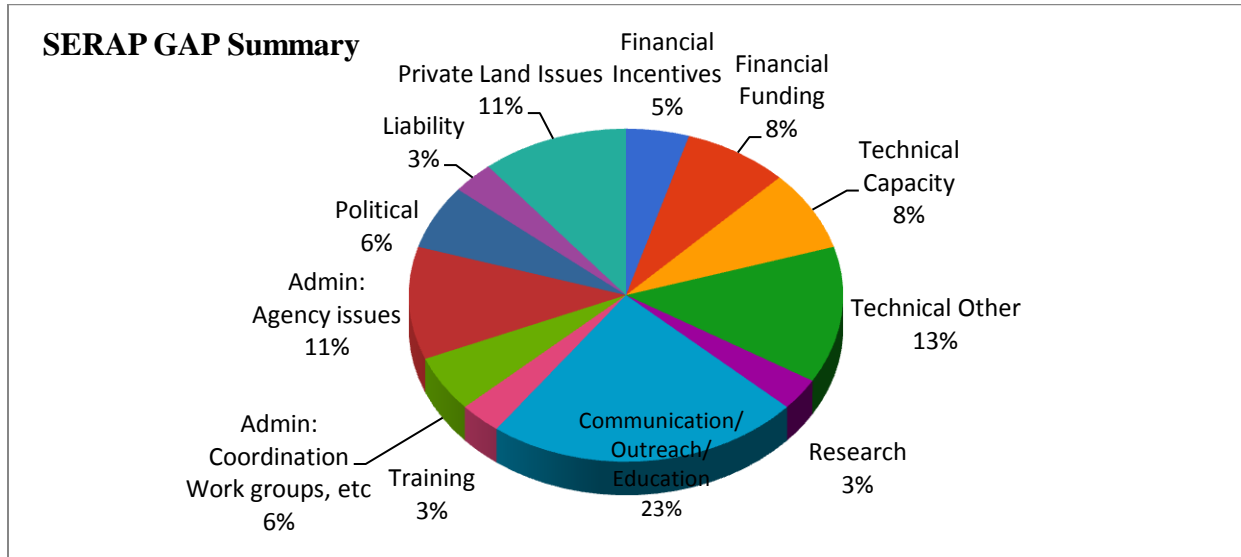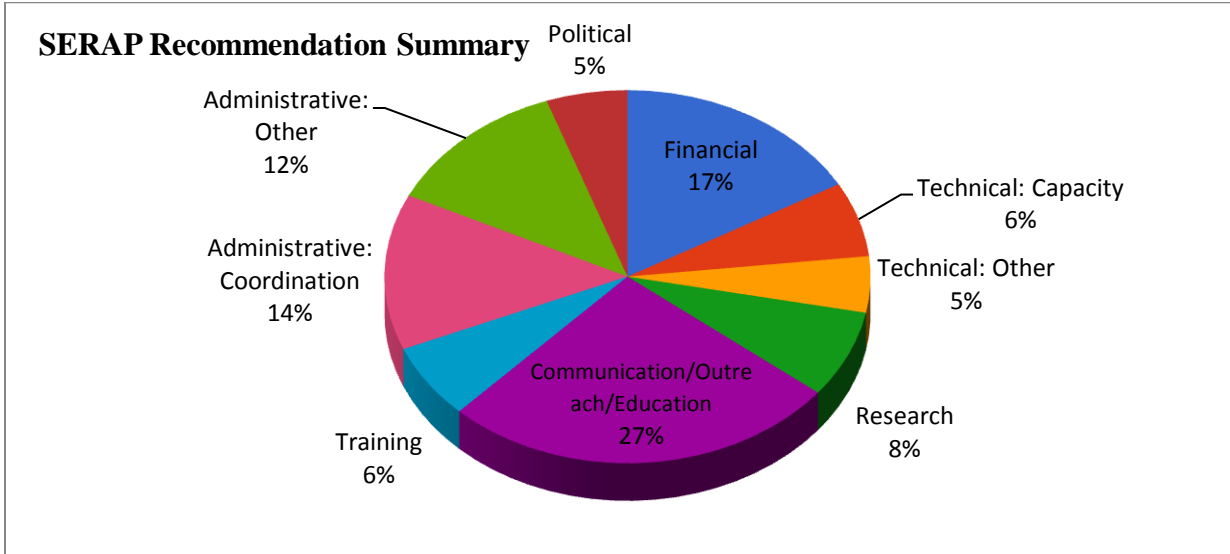**Figure 5.** Recommendations to address identified gaps with the current implementation of the *Comprehensive Strategy for Prescribed Fire to Restore Longleaf Pine in the Southeast United States (SERPPAS)*
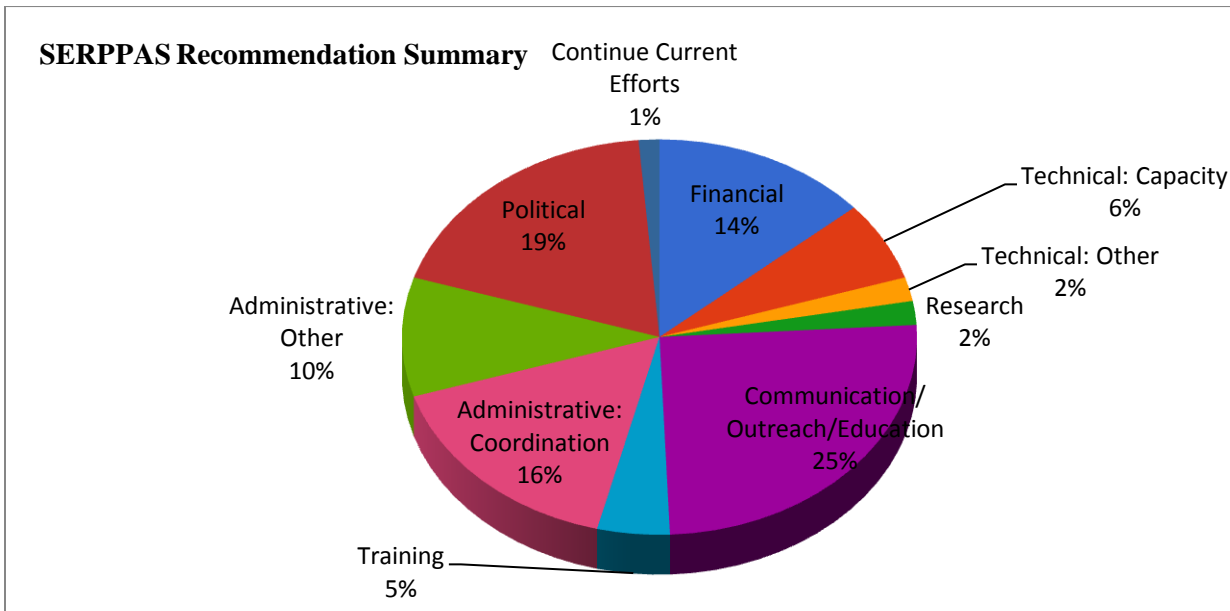
4. Discussion

For resource management agencies to better understand the issues facing the prescribed fire community, collaborative efforts should focus on understanding the current strengths along with the existing internal and external impediments. The results generated from this scan and the content analysis of key informant interviews are a direct product of the feedback of the advisory committee and key informants. It is also important to note that this large and complex area of interest consists of various state, federal and private entities. This indicates that every established SERAP action and SERPPAS goal is not conducive at every stakeholder level, therefore understanding what is achievable while looking bridging gaps is key.

The review of current programs indicates various levels of work toward prescribed fire related efforts implementing SERAP and SERPPAS strategies. Although at least one or more program efforts were detected toward implementing the majority of the outlined SERAP actions and SERPPAS goals, full implementation is impeded by multiple factors inducing major gaps among agencies/organizations, states and across the region. We found that the majority of the reviewed text from the 51 key informants interviews addressing both SERAP and SERPPAS strategies have a consistent vested focus on these major factors attributing the 10 identified gaps outlined above in Figure 2 and Figure 3 which impede achievement of overall objectives.

Table 8. Major themes detected in the content analysis identifying the factors attributing to the gaps within the SERAP and SERPPAS strategies.

Identified Gaps within both SERAP and SERPPAS Strategies	Contributing Factors
Financial •Incentives • Funding	• Lack of incentives for landowners • Agency Budgets/Funding
Technical •Technical Capacity • Technical Other	• Capacity due to pay/compensation • Geographic Barriers •Lack of equipment
Research	• Lack of information regarding the effectiveness of current programs and efforts.
Communication/Outreach/Education	• Not enough distribution of materials • Lack of investment toward non-traditional landowners and agencies
Training	• Lack of opportunities • Lack of consistency across state boundaries
Administration • Coordination, Work groups, etc. •Agency Issues	• Lack of coordination • Lack of planning • Difference in agency missions
Political	• Lack of involvement/understanding of government officials.
Liability	• Lack of insurance opportunities
Private Lands Issues	• Lack of interest • Different objectives

Understanding the relationship dynamics around the research, sociology aspects, economic aspects and political aspects surrounding the gaps and factors affecting prescribed fire efforts is difficult due to their magnitude and complex natures. However, the information gathered from this study identified important relationships between the gap components associated with the 2 strategies. These relationships are greatly affected and dependent on one another, indicating that a complex solution is needed. As a result of the identified gaps, associated recommendations were grouped into 9 categories. These recommendations not only

address the aforementioned strategies individually, but work together to form recommendations that benefit both. The recommendations listed below are collaboration of response from key informants representing a multitude of agencies and organizations across the region.

4.1. Recommendations from the key informant interviews

By taking the results detailed above into consideration, improvements can be made to the implementation of the 14 actions established by SERAP and the 8 benchmark goals by SERPPAS. The breakdown of recommendations under the established categories in Figures 6 and Figure 7 are listed below. These recommendations will help bridge the gaps and promote a unified prescribed fire initiative. The results of the content analysis suggested a better emphasis on addressing communication/outreach/education, financial constraints, administrative coordination and agency conflicts, political influence, training initiatives, technical constraints and research to help prioritize areas to increase burning across the region. Although SERAP and SERPPAS were analyzed separately, the recommendations identified by key informants can be utilized across the board to better achieve fire efforts in a more successful and unified approach. The following recommendations are a collaboration of common themes that are listed from high priority to lowest priority based on the content analysis.

Communication/Outreach/Education

- Educate agencies, organizations and other prescribed fire practitioners how to engage in disseminating information to surrounding landowners about the importance of fire to their goals and objectives.

- Use agencies and organization to provide demonstrations and talk about different parameters that allow for prescribed fire success.

- Evaluate other state education/outreach initiatives to gain suggestions to improve current programs.

- Reach private landowners already looking for information (i.e. new media, news papers, social media, magazines, non-traditional settings, etc.) to inform them on the benefits of fire.

- Link the benefits of fire to people's emotions and things they may be passionate about

such as (longleaf restoration, shortleaf restorations, wildlife benefits, reducing the occurrence of wildfires, etc.

- Provide landowners with more realistic and practical education to address the benefits and implementation of fire on all landscapes (i.e. large tracts, small tracts, non-traditional settings, etc.). Emphasis that size doesn't always matter.

- Utilize extension and forestry agencies to address local landowners and discuss options and opportunities.

- Creatively address risk issues associated with fire without intimidating landowners. Use resources such as Fire Wise or Community Action Plans.

- Identify and educate about liability assistance to agencies and private landowners. Use statistics of liability incidents to reduce the scare factor associated with this topic.

- Identify and educate landowners about assistance availability of programs such as PBAs in their area.

- Implement fire education is school curriculums.

- Create a unified campaigns for things such as PFCs to disseminate to membership and partners.

Financial

- Look for alternative methods to expand capacity without depending on funding. Example: Partner with other agencies to share resources to cut down on cost.

- Increase financial incentives, tax breaks, grants from federal agencies to help landowners afford prescribed fire efforts.

- Look for funding to compile state efforts and programs to help address the unified effort in the most cost effective way.

- "Cut the fat" Reevaluate agency/organization programs, to see the most cost-effective ways to maximize efforts. Use funding for less successful programs to sustain successful programs or fund new positions, increase capacity, promote outreach or providing trainings.

- Develop a liaison position for risk assessment models to promote a more cost-effective method to understand risk. Have this person work with local fire practitioners.

- Seek un-traditional methods for prescribed fire funding (ex. grants for NGOs).

- Inform legislators about federal and state funding needs.

Administrative Coordination and Other issues

- Increase coordination between work groups, agencies and organization to have a consistent common goal on addressing landowners.

- Agencies, organizations and NGOs need to meet frequently to address their current states, needs, and upcoming plans.

- Implement interagency agreements on federal, state and local levels.

  > Example: Southern Escarpment of the Blue Ridge which contains 25 different watersheds.

- Need to do a better job of checking egos at the door and learning to work together.

- Build agency partnerships and communication lines to make progress on collaborative boundaries.

- Minimized the lack of shared boundaries, work together to achieve prescribed fire acreage and frequency.

- Develop common goals, objectives and priorities to get professionals working outside of their agency and work to spur action on surrounding landowners.

  > Example: Florida's Ready, Set, Go program.

- Delegate responsibilities within agencies to achieve fire efforts on priority landscape.

- Delineate a common ground on how agencies accept other's qualifications under various programs.

  > Example: This has been done in Texas, and could be implemented across the south.

Technical capacity and other issues

- Have designated staff such as regional or local fire specialist dedicated to private lands that can serve as burn boss and approve burn plans.

- Have private consultants or contractors that are tied to the community to achieve

prescribed fire on private lands

- Establish temporary/permanent mobile burn teams to take advantage of burning opportunities.

- Employ more full time fire practitioners and fire management personal to increase manpower throughout agencies and organizations.

- Allocate time to prioritize and achieve fire objectives within agencies and organizations.

    Example: Identify priority levels and identify landowners in these areas and promote a large implementation through things such as the Florida Stafford Act.

- Increase tools such as smoke models to improve execution of more technical burns such as urban areas.

- Move to an online system that provides easily visible information on smoke management and allows users to more easily generate burn plans

- Keep risk models current with efforts.

Training

- Provide more training opportunities to private landowners. Find ways to diversify trainings making them larger and more flexible to nontraditional burners to attend.

    Example: Utilize local extension, local agencies and non-profits such as Longleaf Alliance.

- Make training realistic to landowners while still being geared toward SE goals and objectives.

- Provide professional mentors to assist with first time burners.

- Address other parameters such as smoke management and guidelines along with state specific issues without re-teaching the basic of fire science.

- Address other parameters such as smoke management and guidelines along with state specific issues without re-teaching the basic of fire science.

- Understand and evaluate training requirements across the southeast. Make an effort to develop a consistent training agreement and parameters across state lines. This will address the deficiency of certified burners across the SE.

- Make training such as NC S-190, S-130 a requirement at the collegiate level for Forestry, Wildlife, etc majors. This provides already certified personnel entering the job market post graduation.

- Provided opportunities such as scholarships to help allow employees to attend the Prescribed Fire Training center 3 week course when agency funding is not available.

Political

- Make Prescribed Fire Acts that are conducive for each state clear and concise.

- Change state laws to fully protect landowners and develop an more even consensus across the southeast.

- Allow local fire officials to decide if private fire projects are ones to pursue.

- Increase outreach and understanding to legislators that could aid in additional funding resources.

- Learn to talk among agencies about how federal level policies can be adjusted or alters. Choose 2-3 specific policy issues to address annually. Unify to make a cohesive voice.

  Example: Learn from LPC who are currently working with legislative affair specialist in different regions to get a realistic understanding of how much advocacy can be done.

- Federal agencies need to develop a balance between prescribed fire in the SE and wildfires in the west.

- Continue/ Increase petitioning of legislators at all state, federal and private levels. Engage NGO's (i.e. TNC, NWTF, Quail unlimited, etc.) working with policy to work together to achieve coordinated issues. Engage landowners to lobby for increased funding, incentives or policy changes.

- Utilize groups such as SERPPAS who hold more weight than states to serve as advocates to congress.

- Utilize Universities to build on previous work to identify law changes with the engagement of lawyers and prescribed fire councils.

- Get legislators or individuals who may serve in a government role as some point involved in meetings such Longleaf Alliance. Find "Champions for our Cause" (i.e. governors, congressional representatives) to push overall needs of policy change and funding.

- Continue to get Air quality summit support as well as Environmental Protection Agency, EPA involvement to address smoke management programs and policy.

- Stay current with new EPA staff to continue work and leadership of the strong, trusting relationships that exist so momentum and progress is not lost.

Research

- Identify and analyze successful efforts like Fire Leaning Network, Fire Working groups, etc. to get a better idea of ways to achieve established actions and goals set for the SE.

- Use scientist and conservationist to communicated prescribed fire research to communication professionals who reach landowners.

- Utilize professional knowledge and researches to build on previous work, instead of starting over and slowing achievement.

- Look at research and pinpoint the importance if prescribed fire in other focus areas such as hardwoods.

- Conduct more research on the human dimensions aspect of prescribed fire to save time, resources and efforts.

  > Example: Identify areas of frustration where science and research indicate that the ideal strategies many or may not be reached due to physical constraints and lack of resources.

5. Conclusion

The recommendations discussed above provide an insight of ideas and proposed changes to the intricate matrix surrounding prescribed fire efforts throughout the southeast. Although this matrix is greatly influenced by the gaps identified through the key informant interviews, it exemplifies how these gaps and contributing factors are intertwined.. As a region, establishing common overall goals, learning to use conservative approaches toward funding and resources, promoting the involvement of nontraditional prescribed burners and utilizing collaboration among all private, local, state and federal agencies/organization is crucial to promote and sustain prescribed fire across the southeast region.

6. References

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Appendix 1. Agencies and Organizations represented through Key Informant Interviews

1. Alabama Prescribed Fire Council, Alabama Forestry Consultant
2. Austin, Texas Fire Department
3. Bureau of Indian Affairs
4. Brooks Pierce Law Firm
5. Consortium of Appalachian Fire Managers
6. Chattahoochee Chestate FAC Learning Center
7. Environmental Protection Agency (EPA)
8. Florida Forest Service
9. GA Forestry Commission
10. Jones Ecological Research Center
11. Longleaf Alliance
12. Mississippi Wildlife, Fisheries, & Parks
13. Natural Resources Conservation Service
14. NC Department of Ag and Consumer Services
15. NC Natural Heritage Program Director
16. NC State Parks
17. North Carolina State University
18. National Park Service
19. Private Consultant
20. Sandhills Area Land Trust
21. Southern Fire Exchange
22. Southern Group of State Foresters
23. Southern Regional Extension Forestry
24. Tall Timbers Research Station
25. Tennessee Forest Service
26. Texas A&M AgriLife Research and Extension Center
27. The Nature Conservancy
28. U.S. Forest Service
29. U.S. Fish and Wildlife Service
30. Wildland Fire Leadership Council
31. Wildland Restoration International

Appendix 2. Key Informant Interview Template

Key Informant Interview Protocol

1. Greet the interviewee, ask if this time is still convenient
2. Give a brief overview of the project if they are not familiar with it
   a. Operating under it
   b. Interviewee was suggested as a person who could speak to the action items listed on the sheet they were emailed previously
   c. Ask if they have any questions about the project
3. Ensure they understand this isn't an accountability measure or attempt to judge their job performance
4. Ask to record the interview for note-taking purposes
   a. Only record if they consent
5. For each action item, ask the following series of questions:
   a. How would you describe the current state of prescribed fire efforts in relation to effectively [frame action item into future state description]?
   b. Do you believe that a gap exists between the current state you described and the desired future state identified in the strategy?
      i. (PROBE); [If a gap does not exist or there identify relative success short of reaching the future state] What factors do you believe to contribute to successful implementation of related project, programs, etc.
   c. How would you describe what the aforementioned gap?
   d. What factors do you believe contribute to this gap and how would describe their influence?
   e. What recommendations could you provide to help to overcome the identified gap?
6. After all action items are addressed, ask if they interviewee has any other comments relevant to the project to add

Appendix 3. Environmental Scan Categories, Descriptions and Frequencies

Categories for Prescribed Fire Environmental Scan		
Category	**Description**	**Environmental Scan Overall Total**
Financial Assistance	Official help given to a person in the form of loans, loan guaranties, subsidies, tax allowances, cost sharing arrangements, or outright grants provided by third-parties (i.e. government agencies).	81
Technical Assistance	Technical expertise provided for a producer to be able to successfully implement, operate, and maintain prescribed fire on land active in agricultural, forestry, or related uses.	142
Research	The systematic investigation into and study of wildland fire (wildfire and prescribed fire) along with forest management in order to establish facts and reach new conclusions for natural resource management and the establishment of resilient landscapes.	76
Communication, Outreach and Education	Efforts to increase communication among a breadth of stakeholders across the region. Additionally, efforts included in this category would focus on educating private landowners through outreach and students through established educational programs (i.e. university academic programs)	240
Training	Organized activity aimed at imparting information and/or instructions to improve the recipient's performance or to help him or her attain a required level of knowledge or skill (the process of learning the skills you need to do a particular job or activity).	181
Administrative	This category includes efforts focused on promoting regional collaboration and capacity building. For example, efforts that provide structured approaches through the development of committees and workgroups that engage in collaborative planning and implementation would be included in this category. Additionally, efforts that are focused on monitoring effectiveness and accountability for implementing regional strategy actions are compatible for inclusion in this category.	227

Categories for Prescribed Fire Environmental Scan		
Category	**Description**	**Environmental Scan Overall Total**
Information and Technology	This category includes efforts focused on storage and dissemination of information related to wildland fire management and forest management. Also included in this category are technology development and implementation efforts focused on assisting fire managers and other relevant personnel with planning and implementation of various management activities.	181
Other	Resource fulfills efforts outside of the realm of the categories listed above or has an additional effort component to supplement a category(ies). This designation is applied if the effort provides a service other than the ones clearly specified above. Other is applied to resources, such as veteran prescribed fire crews, partnerships or cooperatives with other initiatives outside of prescribed fire, or tasks that 'fall between the cracks.' Further examples include smoke management programs, forest legacy programs, easements, in-house prescribed fire programs, wildfire preparedness, and other tasks related to increasing or supporting prescribed fire efforts on private and public lands in the southeast.	179

Appendix 4. Summary of addressed SERAP actions and their tasks pertaining to prescribed fire versus unaddressed action and their associated tasks as identified through the Environmental Scan

Action	SERAP Actions Being Implemented	Unaddressed SERAP Actions
O.B	• The development and sustain capability and capacity required to plan and achieve landscape treatments, including prescribed fire. (O.B.3)	• Evaluating the RSC structure and augment it with additional partners, while considering additional subcommittees and working groups. (O.B.1) • Continuing long-term support or regional coordination of key partners as well as regional representation at the national level. (O.B.2) • Consideration of pilot projects where appropriate to showcase opportunities and highly successful activities. (0.B.4) • Monitoring effectiveness and accountability for implementing specific task by the RSC. (O.B.5)
2.A	• The development and distribution of landowner publications was used to discuss benefits and cost of using techniques in addition to prescribed burning to reduce fuel loads. (2.A.5)	• Targeting areas using SWRA and other tools were fire is not feasible and promote alternative techniques to prescribe fire. (2.A.1) • Working with regional and national conservation organizations and forest industry to find solutions to increase harvest to improve forest health and reduce fuel loads.(2.A.2) • Coordinating and increasing fire mitigation/harvest actives between public owned lands and private owned lands. (2.A.3) • Targeting non-fire Federal programs to address fuels reduction and alternative treatments. (2.A.4) • Utilizing Federal Emergency Management Agency (FEMA) mitigation funds along with other resources to target risk reduction projects in high priority areas. (2.A.6)

Action	SERAP Actions Being Implemented	Unaddressed SERAP Actions
2.D	• Coordinate managementactivities, including fuels, reduction projects, and prescribed burning, between public land and adjacent private landowners to maximize placement of risk reduction strategies.(2.D.3)• Promote and support the formation of Prescribed Burn Associations, in conjunction with the network of trained service providers, to help private landowners implement Rx fire in the most cost effective way. (2.D.4)	• Working with insurance industry to encourage fuels treatments, buffer development and active management in return for credits or reduced rates on liability insurance and standing timber insurance. (2.D.1)• Working with certification organizations to place a higher emphasis on fuels reduction in high wildfire risk landscape to protect adjacent properties and communities. (2.D.2)• Creating landowner group to collectively manage activities of joint interest where fuel reduction is a by-product. (2.D.5)• Targeting underserved landowners and develop strategies to address high risk landscapes. (2.D.6)• Working with timber investment management organizations and real-estate investments trust to address high wildfire risk on investment-owned lands. (2.D.7)
3.A	• Identify and inform landowners about opportunities that can be used to incorporate prescribed fire in their land management. (3.A.1) • Promote existing and develop campaigns that educate the public on the ecological benefits and need for prescribed fire. (3.A.2) • Develop 'prescribed fire marketing campaigns' that discuss different options a landowner can take to have land prescribed burned. (3.A.3)	• Supporting and expanding landscape level collaborative efforts.(3.A.4)
4.E	• Coordinating fire and management activities, between fire suppression agencies, using cost-effective technology. (4.E.1) • Expanding and protecting federal land management that promotes prescribed burning. (4.E.4) • Tacking and managing number and size of burns on a regional level using combination of satellite imagery and other methods to measure acreage on the ground. (4.E.5)	• Aggressively promoting Southern Wildfire Assessment online portal. (4.E.2) • Publicizing fire management activities on public land using cost effective technology, including social media. (4.E.3) • Utilizing science data as a tool to address the needs and tradeoffs involved in addressing fire at the community level. (4.E.6)

Action	SERAP Actions Being Implemented	Unaddressed SERAP Actions
5.C	• Support and actively outreach the "One Message, Many Voices" campaign and develop other unified prescribed fire education programs throughout the Southeast. (5.C.2)	• Educating the public on WUI and wildland fire challenges and raising awareness of wildland fire challenges in communities at high risk of catastrophic wildfire. (5.C.1) • Using education and incentive programs to encourage property owners to actively manage their land regardless of management objectives in order to reduce the risk of catastrophic fire. (5.C.3) • Leveraging and publicizing SWRA to help communities understand their role in increasing awareness. (5.C.4)
6.A	• Integrate programs between urban forestry and forest management to target small woodlot management and fuels reduction. (6.A.2) • Encourage landowners, through cost-sharing or otherwise, to complete/maintain fuel treatments that provide adequate protection. (6.A.3) • Provide tangible benefits to urban or suburban landowners for prescribed burning. (6.A.4) • Promote and protect private property rights to reduce constraints on landowners to actively manage their land. (6.A.5) • Promote the Southern Research Station's efforts to create a 'Family Forest Center' and communicate the importance of fire and cultural values on family forest lands (6.A.9) .	• Make policy changes to Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS) and U.S. Forest Service programs to further incorporate fuels reduction and fire risk management into core program components and work to expand DOI opportunities to assist private landowners with fuels reduction. (6.A.1) • Working to expand, codify and ease access to restoration funding for private and public land after natural disasters. (6.A.6) • Understanding and communicating the impact of estate taxes, capital gains and ordinary income taxes as well as other areas of concern to landowners that result in no management or loss of lands to non-natural uses. (6.A.7) • Identifying cultural values in local CWPPs and related intergovernmental planning documents. (6.A.8) • Hosting "Community Days" at DoD installation to promote a working relationship with surrounding landowners. (6.A.10) • Developing tribal educational materials for tribal members. (6.A.11) • Encouraging interactive educational programs at both government and non-governmental levels to highlight the multicultural heritage of fire in the Southeast. (6.A.12)

Action	SERAP Actions Being Implemented	Unaddressed SERAP Actions
6.C	• Soliciting inclusion/ participation in the decision making process of regulatory agencies to minimize additional regulatory constraints to prescribed burning and negotiating opportunities to broaden burning opportunities. (6.C.1) • Educate legislative and regulatory officials on the needs and challenges of land managers for using fire as a management tool and its importance to maintaining cultural sites. (6.C.2) • Utilizing and promoting best burning practices. (6.C.3)	• Continuing to support the work of SERPPAS air quality and prescribed fire working teams. (6.C.4) • Improving communications between wildfire responders, air quality regulatory agencies, and law enforcement agencies to expedite public alerts and share options to mitigate smoke impacts on individuals. (6.C.5)
6.D	• Expanding and creating public awareness and education campaigns related to smoke. (6.D.1) • Expand outreach in localized areas before prescribed fires. (6.D.2) •Collect success stories that highlight the benefits of prescribed burning operations compared to wildfires. (6.D.3)	
6.E	• Utilizing forest action plans and wildlife action plans to prioritize areas of highest risk and targeting funds and activities in those areas of high fire occurrence. (6.E.1)	• Creating/promoting programs that engage landowners in identification and control/eradication of highly flammable invasive species. (6.E.2) •Focusing a portion of the U.S. Forest Service Health Program for targeting areas at high risk of wildfire occurrence or areas with high fuel loads due to invasive species occurrence. (6.E.3) • Creating innovative ways to publicize successes in invasive species management to new audience. (6.E.4)

Action	SERAP Actions Being Implemented	Unaddressed SERAP Actions
6.F	• Address prescribed fire practitioner and landowner liability concerns that currently limit their desire or ability to burn, including smoke management issues. (6.F.1) • Provide more assistance and/or incentives for prescribed burning. (6.F.2) • Aggressively promote prescribed burning for wildlife through all conservation (fish and wildlife) programs for most forest types, not just longleaf. (6.F.3) • Enhance training opportunities for consultants and practitioners. (6.F.4) • Work with Landscape Conservation Cooperatives to obtain cooperative funding and create burn plans for larger areas. (6.F.5) • Collect accurate statistics on prescribed fire use to aid in planning and insurance underwriting. (6.F.6) •Work with tribal elders to improve knowledge of fuel reduction project impacts on cultural values and communicate the effectiveness of invasive/exotic treatments near cultural resource areas. (6.F.7)	

Action	SERAP Actions Being Implemented	Unaddressed SERAP Actions
6.G	• Work cooperative across agency lines to accomplish prioritized fuels treatments using mutual agreements, cooperative agreements, or other resource-sharing methods. (6.G.1) • Identify high priority areas for fuels treatments using the SWRA, local knowledge of fuels and fire risk, and other available tools. (6.G.2) • Provide education and outreach to forest products industry as well as new and non-traditional landowners to encourage them to include treatment of wildland fuels as part of integrated management plans. (6.G.3) • Identify areas where fuel treatments provide significant ecological benefits. (6.G.5)	• Encouraging the use of alternative fuels management techniques to treat wildland fuels where prescribed fire is not feasible or appropriate. (6.G.4)
7.A	• Addressing smoke and fire liability issue that is a hindrance to both landowner performing prescribed burns and practitioners in offering burning as a service. (7.A.1) • Working with NRCS, FSA, and other USDA agencies to better incorporate and encourage/require prescribed burning on tribal and private lands. (7.A.2)	• Developing landowner incentives to increase fuels management. (7.A.3) • Working with DOI to develop additional programs for fuels management on private lands in proximity to federal holdings. (7.A.4)
7.D	• Identifying policy barriers that prevent the effective sharing of resources. (7.D.1) • Creating an improved process for sharing trained prescribed fire resources including, but not limited to the National Prescribed Fire Training Center. (7.D.3)	• Overcoming barriers to qualification standard inconsistencies within federal agencies as well as between federal agencies and non-Federal firefighters that pose challenges during the sharing of resources. (7.D.2) • Determining needs related to radio-interoperability and develop a plan to address the needs. (7.D.4) • Identifying complexities that need to be simplified in order to efficiently share resources. (7.D.5) • Improving organizational efficiencies and wildlife response effectiveness. (7.D.6)

Appendix 5. Summary of addressed SERPPAS actions versus unaddressed actions and their associated tasks as identified through the Environmental Scan

Goal	SERPPAS Actions and Tasks Being Implemented	Unaddressed SERPPAS Actions and Tasks
1	• Creating and implementing a communications plan to convey to key decision-makers at the national and regional levels the importance of prescribed fire for longleaf pine, and future resource needs for successful longleaf restoration. (National/Regional, Activity 3) • Leveraging existing organizations to advocate or maintaining or increasing funding for prescribed fire in longleaf pine from Farm Bill Programs. (National/Regional, Activity 5) • Involving the State Coordination Teams in identifying and supporting prescribed fire funding and capacity-building opportunities in state programs as well as initiatives for prescribed burning for longleaf on public and private lands. (State, Activity 1) • Directed to developing a comprehensive, accessible system to inform private landowners of funding opportunities for prescribed burning, eligibility criteria, and how to apply. (State, Activity 2)	• Developing a clearer understanding of how much funding currently is available for prescribed fire, through what programs they are being delivered and how much is needed to reach the longleaf pine. (National/Regional, Activity 1) • Reviewing existing federal programs and identifying opportunities to provide additional support for prescribed fire for longleaf pine.(National/Regional, Activity 2) • Leveraging existing organizations to advocate for increased federal and state dollars to meet future resource needs for prescribed fire, with a focus on assisting landowner with their first burns, while ensuring maintenance burning at appropriate intervals for longleaf pine. (National/Regional, Activity 4) • Encouraging state agencies and non-governmental organizations to evaluate and advocate that recipients of Farm Bill funding achieve desired outcomes. (National/Regional, Activity 6)

Goal	SERPPAS Actions and Tasks Being Implemented	Unaddressed SERPPAS Actions and Tasks
2	• Coordinating multi-state messaging programs on the use and importance of prescribed fire. (National/Regional, Activity 1) • Training public managers and extension agents to be ambassadors for longleaf and prescribed fire. (State, Activity 1) • Conducting workshops to educate landowners about longleaf pine and prescribed fire. (State, Activity 2) • Disseminate prescribed fire messages to landowners through existing networks. (State, Activity 3) • Utilize local implementation Teams to target education to landowners in Significant Geographic Areas for longleaf pine. (State, Activity 4) • Leveraging landowner motivations by developing, marketing, and targeting materials appropriate for their land management objectives. Work through existing networks, including Longleaf Local Implementation Teams and landowner organizations, to reach the appropriate audiences. (Local, Activity 1)	• Developing and promoting an educational component for landowners receiving assistance from Farm Bill, state, or other landowner incentive, cost-share, and technical assistance programs. Leverage the Prescribed Fire Councils, states, and non-governmental organizations to move this vision forward with the appropriate Congressional delegations and/or administrative agencies in Washington, DC. (National/Regional, Activity 2)

Goal	SERPPAS Actions and Tasks Being Implemented	Unaddressed SERPPAS Actions and Tasks
3	• Indentifying, adapting, and diffusing models through existing networks to expand private landowner capacity in Significant Landscapes, Significant Sites, and state-identified priority areas for longleaf pine. (State, Activity 1) • Establishing new and support existing prescribed burn "strike teams" around Significant Landscapes, Significant Sites, and state-identified priority areas for longleaf pine to increase the capacity to burn on public and private lands. (State, Activity 2) • Working with the states to establish locally-based prescribed fire training academies to educate and empower landowners to burn on their own, with scholarships available to promote landowner engagement. (Local, Activity 2).	• Determining what policies/ institutional changes are needed to support formation of Prescribed Burn Associations and advocate for those policies and changes. (Regional, Activity 1) • Encouraging reciprocity among states to enable certified burn managers to operate in multiple states. (Regional, Activity 2) • Identifying and developing opportunities to engage and support private sector practitioners capable of planning and conducting prescribe fire. (Local, Activity 1)
4	• Use prescribed burn training programs to educate landowners about state laws protecting them from liability as well as insurance coverage available in the state. (State, Activity 1) • Engaging State Coordination and Local Implementation Teams to encourage formation of Prescribed of Prescribed Burn Associations in Significant Geographic Areas for longleaf pine where needed. (Local, Activity 1)	• Analyzing and identifying appropriate changes in state and laws and policies regarding liability to decrease the risk of applying fire. (Regional, Activity 1) • Determining what organizational structure/policies need to be in place to allow groups of private landowners to obtain groups or private landowners to obtain group liability insurance coverage and disseminate that information through the State Coordination and Local Implementation Teams, and the Southern Fire Exchange. (State, Activity 2) • Expanding the content of existing messaging and public education campaigns to promote tolerance of smoke and educated the public about what to do if they encounter smoke. (State, Activity 3) • Use landowner workshops and training programs to educate burners about and encourage fire safety and best smoke management practices. (Local, Activity 2)

Goal	SERPPAS Actions and Tasks Being Implemented	Unaddressed SERPPAS Actions and Tasks
5	• Leveraging the Wildland Fire Leadership Council to build support among federal and state agency leadership in the Southeast for prescribed burning activities on public land. (Regional, Activity 1) • Increasing training and staffing capacity to enable public land managers to more effectively apply fire to restore longleaf. (State, Activity 1) • Implement fire on public lands with existing longleaf pine ecosystems at the necessary frequency of 2-3 years. (State, Activity 2). • Implement fire on public lands with a desired future condition of longleaf pine at the necessary frequency of 2-3 years. (State, Activity 3) • Encouraging greater inclusion of prescribed burning in federal and state agency land management plans and ensure adequate resources for public land managers to apply prescribed fire to the extent described in their land management plans. (State, Activity 4)	

Goal	SERPPAS Actions and Tasks Being Implemented	Unaddressed SERPPAS Actions and Tasks
6	• Leveraging existing organizations to engage organizations to engage in relevant EPA public comment periods to ensure a coordinated approach to prescribed fire and air quality in the Southeast. (National/Regional, Activity 2) • Expanding the number of state work groups representing air quality, public health, forest, fire, longleaf and wildlife interests in the public, non-governmental, and private sectors to improve communication, build relationships, and achieve share goals. (State, Activity 4) • Form work group of representatives from state land management and air quality agencies and EPA to enhance communication, foster sharing of lessons learned from past prescribed fire exceptional event demonstrations, and improve understanding of EPA's regulations and guidance for exceptional events. (State, Activity 6) • Disseminating SERPPAS Smoke Management pocket guide. (State, Activity 2)	• Encouraging the Wildland Fire Leadership Council and Environmental Protection Agency to work together to develop air quality standards that support increased prescribed burning in the Southeast. (National/Regional, Activity 1) • Prioritize prescribed burning in areas where air quality is less of a concern. Providing financial and other incentives to enable burning to occur in these prioritized areas. (State, Activity 1) • Holding regular workshops/training programs in every longleaf state to promote best smoke management practices and educate landowners about weather and smoke forecasting tools, such as those available through the Southern Fire Exchange. (State, Activity 3) • Incorporating air quality information into One Message Many Voices Campaign. (State, Activity 5)
7	• Working with existing and emerging efforts to track and share consistent date on longleaf pine acreage ,condition class, and management activities. Developed state specific maps detailing relevant longleaf data. (Regional, Activity 3)	• Track and support the existing effort of GA, NC, TN, SC and LA to develop a fire activity and emissions tracking systems to collect consistent data in their states,(Regional, Activity 1) •Encouraging and provide financial support for other states in the longleaf range to develop or improve online information tracking systems to collect consistent data in their states.(Regional, Activity 2)

Goal	SERPPAS Actions and Tasks Being Implemented	Unaddressed SERPPAS Actions and Tasks
8	• Identifying and supporting a part time program manager to facilitate and coordinate implementation to this strategy. (Regional, Activity 2)	• Implementing the National Coalition of Prescribed Fire Councils' communications strategy and enhance the Coalition's website to help improve communication and collaboration among sate Prescribed Fire Councils to build partnerships, share information, and take action to implement this strategy. (Regional, Activity 1) • Supporting State Coordination Teams in integrating prescribed fire goals and objectives, tailored to the state's prescribed fire needs, into state land management programs and activities. (State, Activity 1) • Supporting State Coordination Teams in coordinating prescribed burning activities for longleaf pine at the state level. This should include channeling additional funding and technical assistance as needed to facilitate strategic goal accomplishment. (State, Activity 2) • Supporting Local Implementation Teams in coordinating prescribed burning activities for longleaf pine at the local level. (Local, Activity 1)

Appendix 6. GAP Category Descriptions

GAP Category	Category Summary
Financial: Incentives	Issues obtaining official help given to landowners in the form of loans, loan guarantees, subsides, tax breaks, cost-share programs or grant from government agencies.
Financial : Funding	Issues constructing financial budget approvals and priorities for state, federal and NGO groups participating in prescribed fire.
Technical: Capacity	Issues with adequate personnel, manpower and equipment needed to successfully implement, operate and maintain prescribed fire on public, federal and private lands.
Technical: Other	Issues practicing and promoting prescribed fire across various landscapes.
Administration: Coordination, workgroups, etc	Issues with coordinating efforts focused on promoting regional collaboration and capacity building through work groups and committees.
Administration: Agency Issues	Issues collaborating federal, state and NGOs missions and willingness to work together to achieve and promote prescribe fire across the landscape.
Training	Issues coordinating organized activity across the southeast aimed at imparting information and/or instructions to improve the recipient's performance or to help him or her attain a required level of knowledge or skill related to prescribed fire.
Research	The systematic investigation into and study current wildland fire along with forest management in order to establish facts and reach new conclusions for natural resource management and the establishment of resilient landscapes.
Communication/Outreach/ Education	The lack of efforts to increase communication among the multiple stakeholders (i.e. general public, non-traditional groups, private landowners, students, etc.) across the region.
Political	Lack of effort discussing prescribe fire with political bodies and legislation pertaining to prescribe fire.

GAP Category	Category Summary
Liability	Issues obtaining official liability insurance for landowners to protect themselves against potential hazards associated with prescribed fire.
Private Land issues	Issues with private landowner willingness to practice, support, and promote prescribed fire.
Continue Current Efforts	No issues identified as a gap preventing the achievement of prescribed fire.
Unable to speak on the issue	Interviewee did not feel comfortable addressing action item due to lack of knowledge and experience.