



Bringing back an ecosystem: Public acceptance of fire and support for longleaf pine habitat restoration

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SUMMARY

When restored to full ecological function, longleaf pine (*Pinus palustris*) forests are among the most diverse forest ecosystems in the world. For the last several decades, substantial restoration efforts have taken place on public lands. While America's Longleaf Restoration Initiative on public lands is considered a success story, much work remains towards landscape scale restoration on private lands to accomplish the overarching goal of reaching eight million acres of longleaf pine habitat by 2025. To better understand attitudes for restoring longleaf pine habitat to its historical extent a team of researchers surveyed forest landowners and the general public across six southern states (Texas, Louisiana, Mississippi, Alabama, Georgia, Florida) within the historical range of longleaf pine. Specifically, the research examined factors driving support for longleaf pine restoration and decision making, including the use of prescribed fire as a management tool. The goal of this publication is to provide managers and other stakeholders with information that will help them design and implement additional longleaf pine restoration initiatives.

KEY FINDINGS

- Both the general public and forest landowners overwhelmingly supported the general goal of longleaf pine habitat restoration.
- Longleaf pine habitat has significant cultural value in addition to biological value.
- There was widespread knowledge and interest regarding longleaf pine and prescribed fire's role in restoring longleaf pine habitat.
- Conversely, landowners expressed more concern about risks related to prescribed fire than their non-landowner counterparts.
- Legal liability, smoke management issues, lack of knowledge, and cost-related issues were cited as constraints to employing prescribed fire.
- Respondents expressed an interest in collaborative management with other landowners to take advantage of economies of scale.

LONGLEAF PINE AND FIRE

Although once encompassing much of the southern coastal plain, longleaf pine currently covers a fraction of its original native range. Across the South, the former longleaf pine landscape has been largely converted to loblolly pine (*P. taeda*), which landowners have tended to favor for its fast growth. However, longleaf pine is characterized by a number of benefits such as high fire, insect, disease, and storm tolerance, ability to grow and thrive on harsh sites, high value timber products, and ecosystem services. In an attempt to raise awareness

of these benefits, public and private initiatives have the goal of restoring eight million acres of longleaf pine by 2025. In turn, private forest landowners are key to expanding longleaf pine's range. Former Secretary of Agriculture John Vilsack said, "Hunters, anglers and multi-generational small private landowners are very important to the rural areas where longleaf pine restoration is most likely to occur." (<https://slowcountryoutdoors.blogspot.com/2010/06/americas-great-outdoors-longleaf-pine.html>. Accessed November 25, 2019).

Longleaf pine cultivation includes a slow initial growth rate due to a three to twelve-year period of substantial root growth, and little vertical growth, called the grass stage. During this period, the tree resembles a cluster of needles at ground-level. The tree's terminal bud, important for continued growth, is insulated by thick needles and covered by protective scales making it somewhat tolerant to low-intensity fire. In turn, the longleaf pine ecosystem is also fire dependent as fire helps to: (1) control brown spot needle blight (2) limit competition on shade intolerant longleaf pine seedlings; and (3) promote conditions that support diverse native plant and animal communities.

The initial prescribed burn should be conducted within the first three years of planting and should reoccur on at least three-year rotations while the trees are in the grass stage. Because longleaf pine landscapes have been drastically altered by humans with the suppression of natural fire cycles to mitigate risks to life and property, forest managers have to incorporate prescribed fire. Prescribed fire is the controlled use of fire for forest management to mimic natural processes. Although prescribed fire is not required for longleaf pine cultivation (herbicides also control competition), the practice controls disease and provides ecological benefits that are unavailable through the use of chemicals. Despite the benefits of longleaf pine and an apparent increase in private lands planting since Hurricane Katrina, forest managers have observed landowners failing to apply the proper burning regimes, if any at all.

LIMITATIONS AND MOTIVATIONS FOR APPLYING PRESCRIBED FIRE

Qualitative interviews and a telephone survey were employed from Texas to Florida (Figure 1) to understand support for restoration associated with prescribed fire.¹ Overall, the majority of research participants were familiar with the term prescribed fire and perceived benefits from the forest management practice (Figures 2 and 3). Interviews across the region highlighted several challenges to applying prescribed fire. The decision to apply prescribed fire can be influenced or impeded by air quality standards, property title, small tract sizes, financial limitations, lack of knowledge about prescribed fire management, lack of understanding about fire's value, and limited access to consultants who can implement the prescription. Many of these challenges are well-known to land managers and, as stated by a professional forester, have been addressed through government incentive programs. Research findings suggest the need to reconcile fairly widespread familiarity with fire (particularly among forest landowners) and the lack of fire on fire-dependent landscapes.

Because of liability, it's big here on all highways and all that's going on they might burn their timber and when it crosses the road you have accidents and it burns your neighbors to death and you have a liability. (private forester)

Yeah if we had more cost share programs that would definitely help. But we have way more applications than we do money to give out for burning. (public forester)

Besides incentives, another motivating factor was outreach programs educating landowners about personal safety and risk reduction, while preserving and enhancing the health of forests. Informants were aware of educational programs:

¹For detailed methods, see Gordon et al. (in review) and Thapa 2018.

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Longleaf Alliance has tours and everything and I think a lot of that stuff is available to people. (landowner)

Texas Forest Service sends out e-mails all the time and has seminars on it. The Longleaf Alliance has really worked hard educating people.... (landowner)

As a whole, landowners expressed more concern about risks related to prescribed fire than their non-landowner counterparts. Respondents with more than 50 acres of forestland perceived greater benefits from prescribed fire, on average, although this difference could have been due to chance. By comparison, landowners with less than 50 acres were more likely to agree that prescribed fire can endanger life. Contrary to expectations, rural residents tended to demonstrate more favorable attitudes towards prescribed fire's benefits than their urban counterparts, and they were less likely to perceive the risk of prescribed fire endangering wildlife or human life. This finding, however, needs substantiation from future studies. For landowners to truly understand the role of prescribed fire, educational programs must communicate clearly and consistently across all areas where longleaf pine used to be a native habitat.

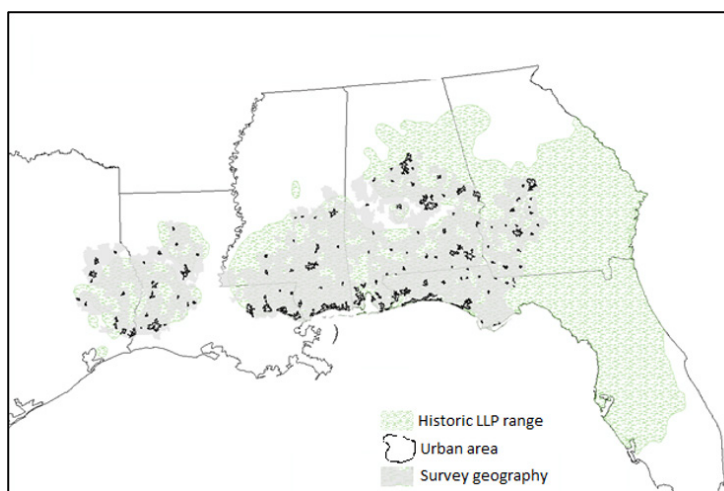


Figure 1: Research area

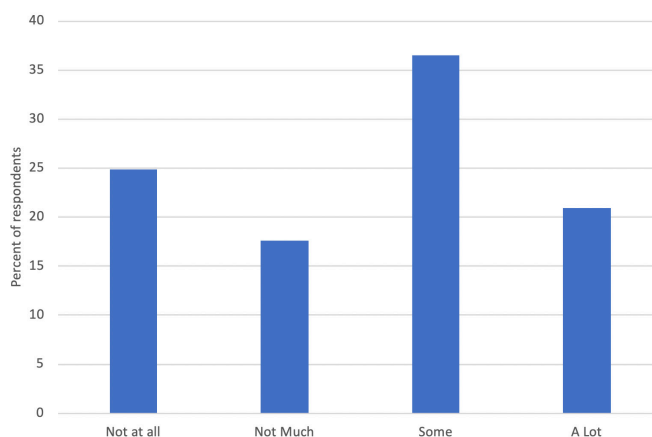


Figure 2: Percent of 2,700 respondents (including 821 forest landowners) familiar with the term prescribed fire

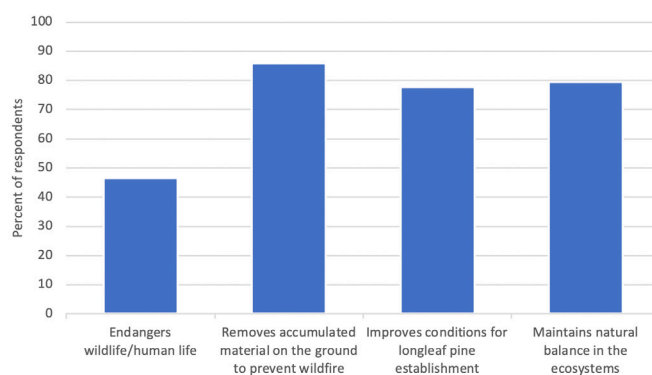


Figure 3: Percent of 2,700 respondents (including 821 forest landowners) agreeing that prescribed fire endangers life, decreases fuel load, improves habitat, and maintains ecosystems

SUPPORT FOR LONGLEAF PINE HABITAT RESTORATION

Study participants regarded longleaf pine as a very important species, ecologically and economically, with less than a quarter of survey participants reporting no familiarity with the species (Figure 4). Even after researchers described the longleaf ecosystem to respondents unfamiliar with it, the majority of all participants (85%) expressed interest in reestablishment of longleaf pine (Figure 5). Those who supported restoration tended to have more knowledge about longleaf pine than those who did not support restoration or who were unsure (Figure 6). Measures of knowledge included: (1) understanding that the species was once a dominant forest ecosystem; (2) the ecosystem provides habitat for many plant and animal species; (3) fire benefits longleaf habitat; and (4) some property owners participate in longleaf conservation programs. Further, non-landowners were 2.3 times more likely than landowners to support restoration.

Of 821 forest landowners who participated in the telephone survey, 51% owned at least one acre of longleaf pine. Forest owners with smaller parcels (less than 50 acres) tended to support restoration more than those with more than 50 acres by three to one. Still, longleaf owners overall were involved in management in some form. When asked about whether or not landowners were managing their longleaf pine forest, one participant reported that appealing ecological characteristics of the species makes longleaf important to manage and restore (see quote below). Another research participant noted that education and incentive programs were key motivators for managing longleaf pine. The second quote below reflects the effectiveness of incentive programs in longleaf restoration, but also demonstrates how longleaf cultivation coincides with diverse ownership objectives.

The most appealing [characteristics] is probably the legacy of the longleaf savannah and the continuing the legacy of what the land base used to look like. (landowner)

[Longleaf pine has increased for two reasons]. One is public perceptions, so preaching that longleaf pine was natural and then landowners say well I want what's natural and then number two would be government incentive programs. (wildlife biologist)

Related to the first quote above is attachment to place as an important influence in support of longleaf pine restoration. Place attachment reflects emotional and functional connections between people and places. Two questions from the research addressed place attachment. One question asked telephone survey participants for their preferred type of landscape (Figure 7). The majority of participants selected a landscape that reflected a well-managed longleaf pine stand with scattered trees and open savannah. The fewest number of participants preferred a forest with dense understory.

A second question used a scale to measure how participants used their longleaf pine landscape and how emotionally connected they were to the landscape (known as place attachment). Holding all other factors (such as age, gender, education, and income) constant, respondents were twice as likely to support restoration as their score from this question increased. This finding reflects longleaf pine as an iconic feature of study participants' landscapes and helps to explain the widespread support for restoration, regardless of forest ownership, living in an urban or rural place, or other factors.

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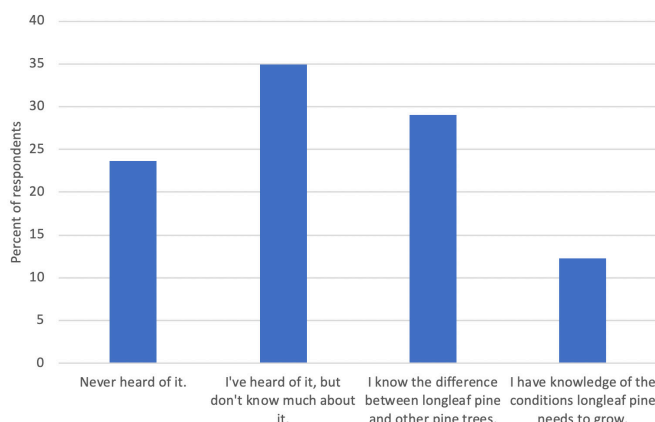


Figure 4: Familiarity with longleaf pine among 2,700 respondents (including 821 forest landowners)

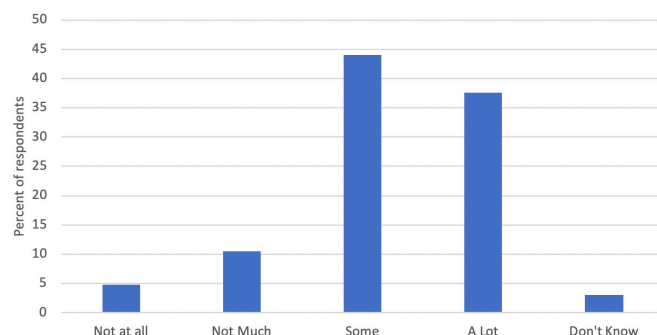


Figure 5: Interest in reestablishment of longleaf pine.

Figure 6: Comparison between survey respondents who supported or did not support longleaf pine restoration based on knowledge about longleaf pine

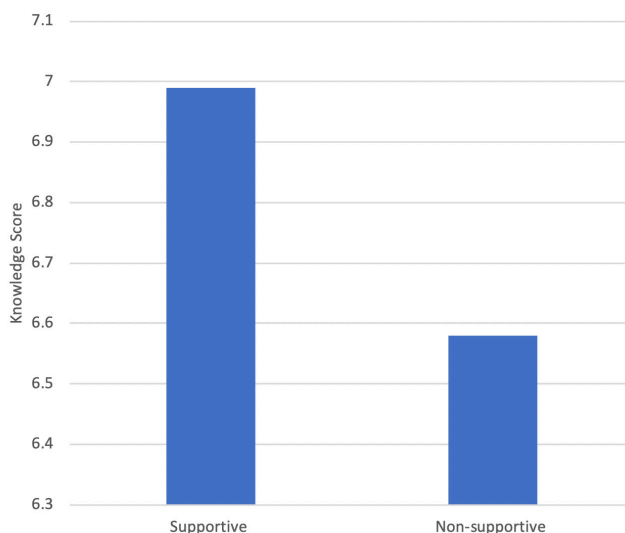


Figure 7: Landscape preferences



An open landscape with scattered trees, native grasses, and forbs.

A dense forest with hardly any light entering the canopy and little vegetation growing in the ground.

A forest with some light reaching a forest floor covered in a thick layer of pine straw and deadwood.

A dense forest with hardly any light reaching the forest floor, but with dense understory of palmetto and vines.

Note: 10% did not know or did not answer

LONGLEAF PINE RESTORATION AND PRESCRIBED FIRE

Both telephone and face to face results demonstrated that participants who were interested in longleaf pine were also favorable about prescribed fire (Figure 8). The two quotes below provide examples.

Most landowners who care about longleaf pine whatsoever learn [that it's linked] to fire quickly, yes. (private forester)

Most everyone I talk to about longleaf is interested in [prescribed fire]. (landowner)

Other findings demonstrated landowners were interested in collaborating with other landowners and organizations at the regional, state, and local levels for applying prescribed fire to longleaf stands. Participants reported:

Landowners have a lot of lands out there and they actually do have burn associations, a co-op, they call it a burn co-op and they do [prescribed burns], it works good. (public forester)

Most everyone I talk to about longleaf is interested in some form of [collaboration]. (landowner)

Collaborating with other private landowners can get the costs down. (private forester)

These findings suggest that factors such as incentives, outreach, and collaboration are important to the success of applying prescribed fire to longleaf restoration programs.

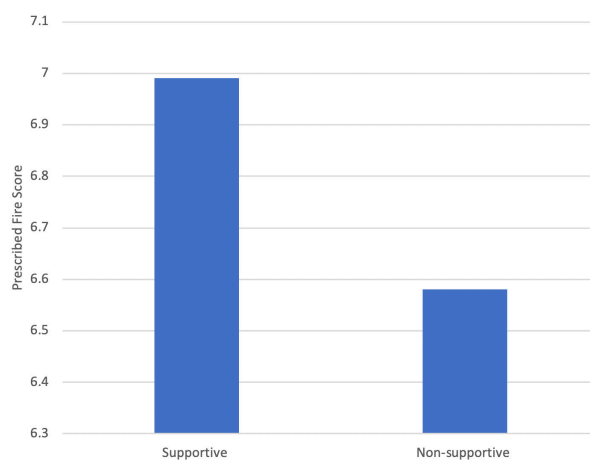


Figure 8: Comparison of prescribed fire scores between supportive and non-supportive respondents

SUMMARY AND CONCLUSION

Figure 9 summarizes support for longleaf pine restoration and attitudes about prescribed fire based on forest landownership and rural or urban residence. Comparing landowners, those landowners with less than fifty acres tended to be more supportive of longleaf pine restoration. They also tended to have somewhat higher negative attitudes about prescribed fire than their counterparts. By contrast, those owning more than 50 acres exhibited more knowledge about longleaf pine and demonstrated higher positive attitudes about prescribed fire. Comparing urban and rural respondents, urban residents were more likely to support longleaf pine restoration but had more concerns about prescribed fire than their rural counterparts. Rural residents had higher longleaf pine knowledge scores and were more likely to have positive attitudes towards prescribed fire.

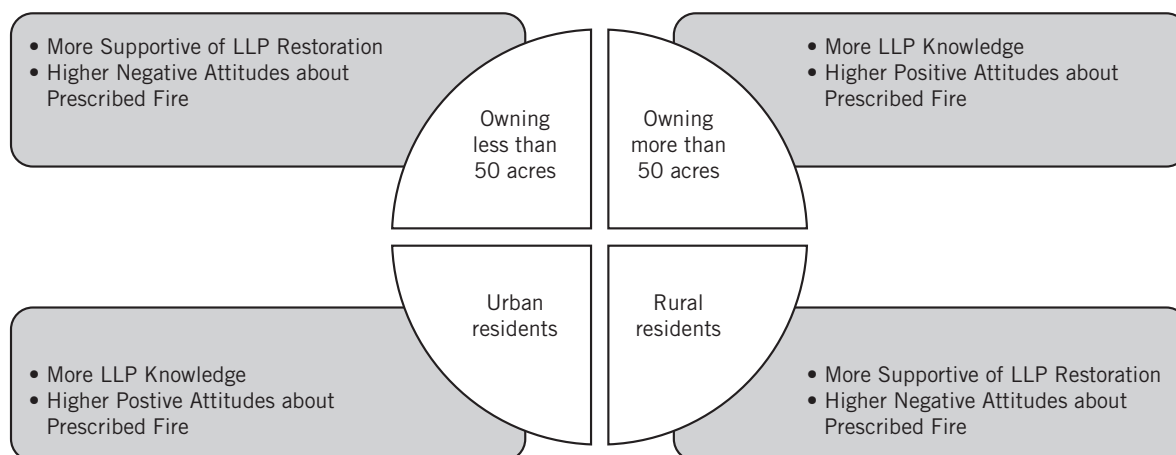


Figure 9: *Support for longleaf pine restoration and attitudes about prescribed fire*

Prescribed fire on private forest lands substantially aids restoration and maintenance of fire-dependent plant communities such as longleaf pine. There is a clear need for effective and efficient use of budgetary and technical resources, and partnerships, given various reasons not to implement prescribed fire. Overcoming these limiting factors requires a joint effort by all those that will benefit, including the general public, environmental groups, and agencies. Efforts to educate landowners will provide opportunities to increase burning on private forestlands in the southeastern United States. Furthermore, as longleaf pine restoration efforts are scaled up, more monetary resources will be needed to further incentivize landowners and reduce their risk.

MANAGEMENT IMPLICATIONS

Land managers and others interested in longleaf pine habitat restoration should consider:

- Renewed and expanded efforts to educate landowners on increasing their use of prescribed fire.
- Increasing monetary resources to further incentivize landowners.
- Implementing burning cooperatives, which may fit well with landowners interested in longleaf pine restoration.
- Strategic demonstration of aesthetic preferences, as well as consideration of place attachment, in management can encourage more landowners to engage in prescribed fire as well as build public support for restoration initiatives.
- It is important to consider broad public opinion in landscape scale restoration as well as private land owners' perspectives.

REFERENCES AND FURTHER INFORMATION

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