Texas Potential Prescribed Fire Benefit

An Analysis of Land Meeting Conditions Favorable to Prescribed Burning

Technical Report

October 2024

Summary

Texas ecosystems have evolved with periodic fire resulting in landscapes that are fire-adapted or fire-dependent. This adaptation or dependency requires periodic fire to maintain natural ecosystem functions and resiliency. Over time and with a growing population, Texas has seen many communities develop within the wildland urban interface in its fire-prone landscapes. These communities are threatened when unwanted and unplanned wildland fire moves through these landscapes.

Prescribed burning is a management tool used to reduce fuels, maintain resilient and productive landscapes, and protect communities. Potential benefit from prescribed fire depends on multiple factors, including management objectives, cost, and fire ecology. Likewise, the benefits derived from prescribed fire are also multi-faceted, from improved timber production and forest health to providing quality wildlife habitat and improving range conditions, to reducing fuel loadings and risk of wildfire damage to the landscape and nearby communities. The level of benefit varies according to cost effectiveness, the capacity of the landscape to carry fire, and the feasibility of meeting objectives, which may be subjective.

Focusing on management and ecological considerations, of the 172 million acres of total area in Texas, 88 million acres of forest, shrub, and grass lands could potentially benefit from the application of fire or other fuel reduction management activity, with high benefit on 69 million of those acres. Of the 88 million acres that could benefit from prescribed fire, 27 million acres would provide benefit to community areas by reducing risk of wildland fire. On average, treatment of 14 million acres annually would maintain healthy, resilient natural landscapes throughout the state.

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Overview

Texas ecosystems have evolved with periodic fire resulting in landscapes that are fire-adapted or fire-dependent. This adaptation or dependency requires periodic fire to maintain natural ecosystem functions and resiliency. Over time and with a growing population, Texas has seen many communities develop within the wildland urban interface in its fire-prone landscapes. These communities are threatened when unwanted and unplanned wildland fire moves through these landscapes.

Prescribed burning is a management tool used to reduce fuels, maintain resilient and productive landscapes, and protect communities. Potential benefit from prescribed fire depends on multiple factors, including management objectives, cost, and fire ecology. Likewise, the benefits derived from prescribed fire are also multi-faceted, from improved timber production and forest health to providing quality wildlife habitat and improving range conditions, to reducing fuel loadings and risk of wildfire damage to the landscape and nearby communities. The level of benefit varies according to cost effectiveness, the capacity of the landscape to carry fire, and the feasibility of meeting objectives, which may be subjective. An example of high benefit is an area with low treatment cost and high effectiveness in meeting multiple management objectives, whereas an example of moderate benefit might have higher cost or lower effectiveness. Examples of low or no benefit include areas where prescribed fire is either cost prohibitive, contrary to management objectives, or not effective/feasible. This study primarily focuses on management and ecological considerations to determine the potential benefit level for each of the land types considered but also captures how much of the identified area would benefit communities.

About the Data

This report contains information derived from Forest Inventory & Analysis[1] and other sources. For this analysis, the state is divided into two major regions: East Texas, which is defined as the 43 counties traditionally managed for timber production, and Central/West Texas, which is the remainder of the state and includes south Texas, north Texas, central Texas, the panhandle, and the Trans-Pecos. The FIA data for East Texas was generally collected from 2017 to 2021, and the data for Central/West Texas was generally collected from 2010 to 2019. Additional data from LANDFIRE[2] was used to cover non-forest areas of interest.

Figure 1. Regions of Texas used for analysis.

Context

Land Cover

Texas is a large and diverse state, covering a total of 172 million acres. There are approximately 60 million acres of forestland in Texas—12 million in East Texas and 48 million in Central/West Texas—where forestland is defined per the USDA Forest Service as land that has at least 10 percent canopy cover by trees of any size and that is at least an acre in size and 120 feet wide, including land that previously had such cover and will be naturally or artificially regenerated.

There are an additional 29 million acres of shrubland and 21 million acres of grassland, primarily in Central/West Texas.

Of the 60 million acres of forestland, 24 million acres (40%) occur near community areas, while 3 million acres (11%) of shrubland and 6 million acres (31%) of grassland occur near community areas. Proximity to community areas is defined as having at least 25 buildings within two miles.

The remaining area of the state is primarily cultivated crops, pasture/hay, and developed lands, which are not part of this analysis.

[see full-size map at end of document]

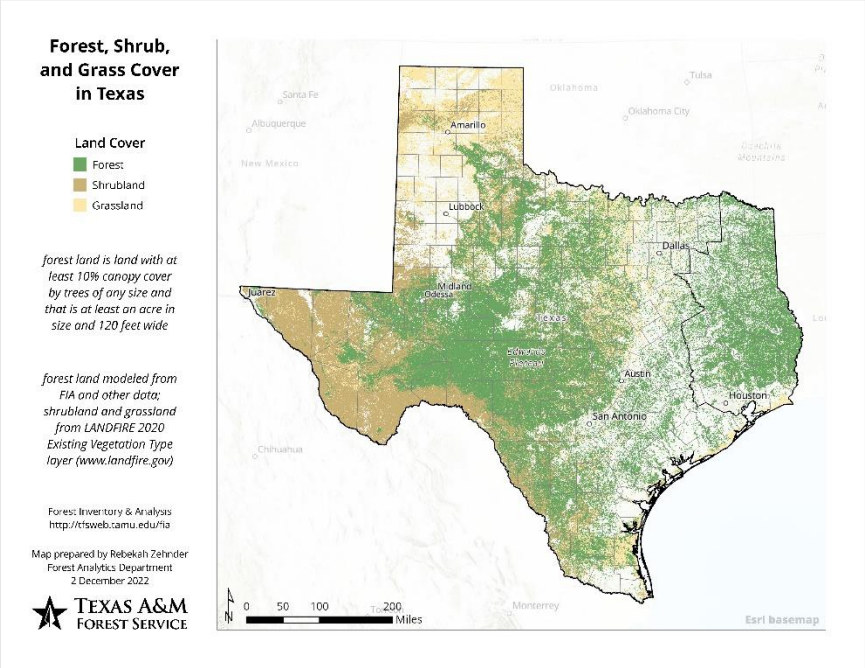

Figure 2. Map of forest, shrub, and grassland cover in Texas.

Types of forest vary across the state, from pine timberlands of East Texas to mesquite and juniper woodlands of Central/West Texas.

[see full-size map at end of document]

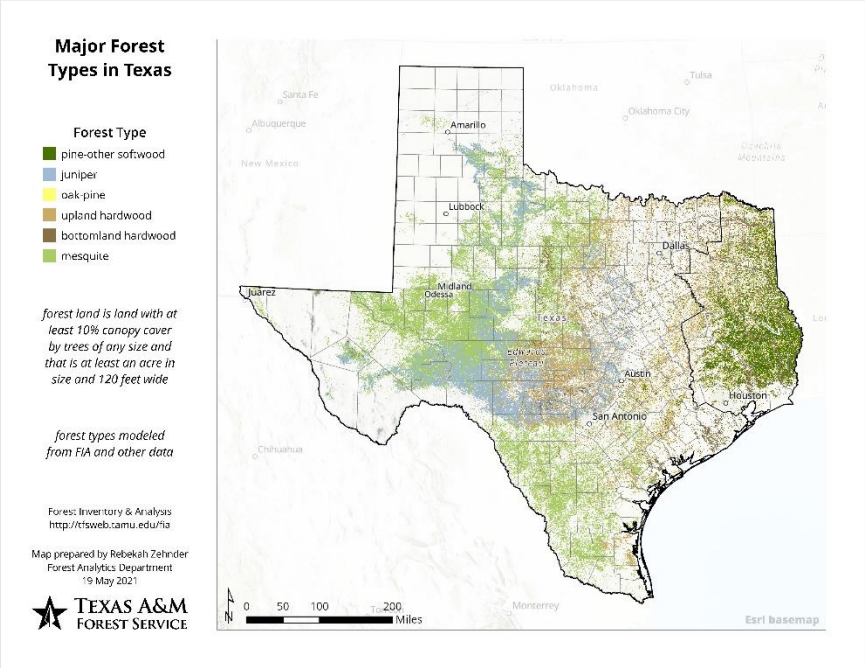

Figure 3. Map of major forest types in Texas.

Almost all of the pine forest type occurs in East Texas, while the juniper and mesquite types occur in Central/West Texas.

The pine/other softwood forest type includes loblolly pine, eastern redcedar, shortleaf pine, slash pine, and longleaf pine. The oak/pine group includes pine/hardwood and eastern redcedar/hardwood. Upland hardwood is the oak/hickory forest type group. Bottomland hardwood includes the elm/ash/cottonwood, oak/gum/cypress, other hardwoods, exotic hardwoods, and tropical hardwoods forest type groups. Nonstocked forest is that which previously met the definition of forest and is expected to be naturally or artificially regenerated.

Table 1. Area of forestland by forest type and region.

	East Texas	Central/ West Texas	Total
		million acres	
Pine/other softwood	5.7	0.3	5.9
Juniper	–	8.7	8.7
Oak/pine	1.4	0.4	1.8
Upland hardwood	2.5	9.9	12.4
Bottomland hardwood	2.1	3.2	5.3
Mesquite	<0.1	21.4	21.4
Nonstocked	0.1	4.1	4.2
Total	**11.8**	**47.9**	**59.7**

A portion of the acreage across these cover types can support prescribed and/or wildfire under various weather conditions and management objectives. Assessing by cover type and attributes such as stand age and density, this acreage was partitioned by the level of benefit it could receive from prescribed fire.

Forest Ownership

In Texas, most of the state's 60 million acres of forest is privately owned. About 5 percent of East Texas forestland is owned by the National Forest System, and about 3 percent of the forest and woodland area in Central/West Texas is owned by the state.

Table 2. Area of forestland by ownership and region.

	East Texas	Central/ West Texas	Total
		million acres	
Federal	1.0	0.7	1.7
National Forests and Grasslands	0.6	<0.1	0.7
National Park Service	0.1	0.1	0.2
Fish and Wildlife Service	<0.1	0.2	0.2
Department of Defense	0.2	0.4	0.6
Other federal	–	<0.1	<0.1
State	0.1	1.6	1.7
County and Local Government	0.1	0.6	0.7
Total Public	1.2	2.9	4.1
Private	10.6	45.0	55.6
Total	**11.8**	**47.9**	**59.7**

Potential Prescribed Fire Benefit

Overall, 88 million acres of Texas forest, shrub, and grass lands meet conditions that could at least moderately benefit from prescribed fire. Applying fire return intervals (the average time between fires in a given area) by cover type,[3] this amounts to 14.2 million acres per year on average.

From a total land area perspective, the largest portion of this area—48 million acres—is from forests and woodlands, with an additional 20 million acres of shrubland and 20 million acres of grassland identified as potentially benefiting at least moderately from prescribed fire. Considering fire return intervals by cover type, 6.8 million acres of grassland, 5.4 million acres of forest/woodland, and 2.0 million acres of shrubland could at least moderately benefit on average annually.

Table 3. Area and average annual area with potential to benefit from prescribed burning by land cover type.

	Moderate	High	Total	Moderate	High	Total
	million acres			*million acres per year*		
Pine/other softwood	0.2	5.0	5.2	<0.1	1.0	1.0
Juniper	1.5	6.7	8.2	0.1	0.7	0.8
Oak/pine	0.4	1.3	1.7	0.1	0.2	0.2
Upland hardwood	7.1	4.3	11.4	0.7	0.4	1.1
Bottomland hardwood	–	–	–	–	–	–

	Moderate	High	Total	Moderate	High	Total
	million acres			*million acres per year*		
Mesquite	1.6	19.7	21.4	0.2	2.0	2.1
Shrubland	7.3	12.5	19.8	0.7	1.2	2.0
Grassland	1.1	19.3	20.4	0.4	6.4	6.8
Total	**19.2**	**68.8**	**88.0**	**3.2**	**12.0**	**14.2**

Of the 88 million acres with moderate or high potential prescribed fire benefit, 27 million acres would benefit community areas. Again applying fire return intervals, this amounts to an average of 4.6 million acres per year.

Table 4. Area and average annual area near community areas with potential to benefit from prescribed burning by land cover type.

	Moderate	High	Total	Moderate	High	Total
	million acres			*million acres per year*		
Pine/other softwood	0.2	4.1	4.2	<0.1	0.8	0.8
Juniper	0.5	1.2	1.7	0.1	0.1	0.2
Oak/pine	0.4	1.1	1.5	0.1	0.2	0.2
Upland hardwood	4.7	1.9	6.6	0.5	0.2	0.7
Bottomland hardwood	–	–	–	–	–	–
Mesquite	0.4	3.5	3.9	<0.1	0.3	0.4
Shrubland	0.3	2.5	2.8	<0.1	0.3	0.3
Grassland	0.1	6.2	6.2	<0.1	2.1	2.1
Total	**6.6**	**20.5**	**27.0**	**0.7**	**3.9**	**4.6**

Pine Forest

East

Prescribed fire in this forest type is often used to control unwanted vegetation to reduce competition, favor nutrient cycling, and improve forest resilience. Assuming a general goal of growing pine timber and improving wildlife habitat, the greatest benefit from prescribed fire is in pine stands that are at least 10 years old. Moderate benefit can also be seen in younger stands that are understocked, using low intensity fire to encourage stand development or for site preparation to reestablish the stand. Generally, young stands that are adequately stocked would see little benefit from prescribed fire, with the exception of longleaf and shortleaf stands, for which prescribed burning is recommended and necessary to promote survival and growth.

Table 5. Forest area by level of potential prescribed fire benefit for pine forest types in East Texas.

	None/Low	Moderate	High	Total
		million acres		
Pine/other softwood	0.8	0.1	4.8	5.7
Area near communities	0.5	0.1	4.0	4.6

Prescribed fire could be highly beneficial to 4.8 million acres of pine forest in East Texas and at least moderately beneficial to 4.9 million acres. With a fire return interval of 5 years, on average 1.0 million

acres of pine forest in East Texas could highly benefit from prescribed fire annually, and marginally more could at least moderately benefit. Of the 4.9 million acres with potential to at least moderately benefit from prescribed fire, 4.0 million acres (0.8 million acres per year on average) would benefit communities.

Central/West

Prescribed fire in Central/West Texas pine forests — the Lost Pines in Central Texas and mountain pine forests in West Texas — is used to reduce unwanted vegetation, improve forest health, enhance wildlife habitat, mitigate wildfire, and encourage diversity of plant and animal communities. Benefits from prescribed fire in this forest type generally vary with stand age and stocking. Assuming a general goal of managing stands for aesthetics, habitat, and other ecosystem services, the greatest benefit is in stands at least 20 years old with low canopy closure or stocking, where prescribed fire can be used to maintain pine savanna and provide quality wildlife habitat. Moderate benefit is possible in stands at least 20 years old with moderate to high canopy closure or stocking, where prescribed fire can be used to reduce fine fuel load, manage understory vegetation, and provide quality wildlife habitat, all of which reduce fuel loading. Stands younger than 20 years old do not stand to benefit from prescribed fire, and use should be limited in order to prevent scorch or mortality.

Table 6. Forest area by level of potential prescribed fire benefit for pine forest types in Central/West Texas.

	None/Low	Moderate	High	Total
		million acres		
Pine/other softwood	<0.1	0.1	0.1	0.3
Area near communities	<0.1	0.1	0.1	0.3

Overall, 0.1 million acres of pine forest in Central/West Texas have potential to highly benefit from prescribed fire, and 0.2 million acres have potential to at least moderately benefit. With a fire return interval of 5 years, this means less than 0.1 million acres could benefit on average annually. Nearly all of the 0.2 million acres with potential to at least moderately benefit from prescribed fire would also benefit communities.

Juniper Woodlands

Juniper woodlands are restricted to the Central/West Texas region. Historically, juniper was restricted in range by certain topographic features as well as by periodic fire and grazing practices, though substantial encroachment has occurred. The main use of prescribed fire in juniper woodlands is to reduce woody encroachment on grasslands. Open canopy stands of juniper up to 80 years old stand to highly benefit from prescribed fire, which would reduce juniper encroachment on grasslands, maintain a juniper savanna ecotype, and promote habitat diversity. Young stands (less than 20 years old) with closed canopy would also highly benefit from prescribed fire, since this would likely create openings that result in habitat diversity. Older closed canopy stands up to 80 years old would see moderate benefit from prescribed fire. Use of prescribed fire in these stands may be difficult due to limited surface fuels, but when successful, it would create openings for habitat diversity and reduce canopy fuels. Old juniper woodlands, over 80 years old, would receive little to no benefit from prescribed fire. Use of prescribed fire in these stands should be limited in order to protect the trees and maintain habitat for wildlife species that depend on this habitat type.

Table 7. Forest area by level of potential prescribed fire benefit for juniper forest types in Central/West Texas.

	None/Low	Moderate	High	Total
		million acres		
Juniper	0.5	1.5	6.7	8.7
Area near communities	0.2	0.5	1.2	1.9

Of the 8.7 million acres of juniper woodlands in Central/West Texas, 6.7 million acres have potential to highly benefit from prescribed fire and 8.2 million acres have potential to at least moderately benefit from prescribed fire. Annually, assuming a fire return interval of 10 years, 0.7 million acres of juniper woodland on average could highly benefit from prescribed fire, and 0.8 million acres could at least moderately benefit. Of the 8.2 million acres with potential to at least moderately benefit from prescribed fire, 1.7 million acres (0.2 million acres per year on average) would benefit communities.

Oak/Pine Forest and Woodlands

East

Assuming a general goal of growing timber favoring pine and using prescribed fire to reduce unwanted vegetation to reduce competition and favor nutrient cycling, mixed stands of any age that have low stocking and well-stocked stands at least 10 years old could highly benefit from prescribed fire. Younger well-stocked stands could benefit moderately from prescribed fire.

Table 8. Forest area by level of potential prescribed fire benefit for oak/pine forest types in East Texas.

	None/Low	Moderate	High	Total
		million acres		
Oak/pine	–	0.2	1.2	1.4
Area near communities	–	0.2	1.1	1.2

Of the 1.4 million acres of oak/pine forest in East Texas, 1.2 million acres could highly benefit from prescribed fire, and 1.4 million acres have potential to at least moderately benefit. Assuming a fire return interval of approximately 7 years, on average 0.2 million acres annually could highly benefit from prescribed fire, with a marginal additional amount receiving moderate benefit annually. Of the 1.4 million acres with potential to at least moderately benefit from prescribed fire, 1.2 million acres (0.2 million acres per year on average) would benefit communities.

Central/West

Prescribed fire in Central/West Texas oak/pine forests and woodlands is used to reduce unwanted vegetation, improve forest health, enhance wildlife habitat, and encourage diversity of plant and animal communities. Benefits from prescribed fire in this forest type vary with stand age and stocking. Assuming a general goal of managing stands for aesthetics, habitat, and other ecosystem services, the greatest benefit is in stands at least 20 years old with low canopy closure or stocking, where prescribed fire can be used to maintain oak-pine savanna and provide quality wildlife habitat. Moderate benefit is possible in stands at least 20 years old with moderate to high canopy closure or stocking, where prescribed fire can be used to reduce fuel loading, manage understory vegetation, and provide quality wildlife habitat. Stands younger than 20 years old do not stand to benefit from prescribed fire, and use should be limited in order to prevent scorch or mortality.

Table 9. Forest area by level of potential prescribed fire benefit for oak/pine forest types in Central/West Texas.

	None/Low	Moderate	High	Total
		million acres		
Oak/pine	<0.1	0.2	0.1	0.4
Area near communities	<0.1	0.2	0.1	0.3

Of the 0.4 million acres of oak/pine forest in Central/West Texas, 0.1 million acres have potential to highly benefit from prescribed fire, and 0.3 million acres have potential to at least moderately benefit. Assuming a fire return interval of approximately 7 years, on average less than 0.1 million acres annually could benefit from prescribed fire. Most of the 0.3 million acres with potential to at least moderately benefit from prescribed fire would also benefit communities.

Upland Hardwood Forest and Woodlands

East

Assuming a general goal of growing hardwood timber to produce quality wood, prescribed fire use in upland hardwood forests should be limited but may be used to favor wildlife habitat. Upland hardwood stands that are at least 10 years old could moderately benefit from prescribed fire, when applied appropriately, to protect quality hardwood timber. Prescribed fire would be of minimal benefit in younger stands, where the intensity of fire should be limited in order to promote stand development.

Table 10. Forest area by level of potential prescribed fire benefit for upland hardwood forest types in East Texas.

	None/Low	Moderate	High	Total
		million acres		
Upland hardwood	0.3	2.2	–	2.5
Area near communities	0.3	2.0	–	2.3

In East Texas, 2.2 million acres of upland hardwood forest have potential to moderately benefit from prescribed fire. Annually, assuming a fire return interval of 10 years, approximately 0.2 million acres on average would benefit. Upland hardwood forests in East Texas are not targets for high prescribed fire benefit. Of the 2.2 million acres with potential to moderately benefit from prescribed fire, 2.0 million acres (0.2 million acres per year on average) would benefit communities.

Central/West

Assuming a general goal of managing stands for aesthetics, habitat, and other ecosystem services, prescribed fire is used in upland hardwood forests and woodlands to reduce unwanted vegetation, improve wildlife habitat, and encourage diversity of plant and animal communities. Maximum benefit will be attained in stands that are at least 20 years old with low canopy closure or stocking, where prescribed fire can be used to maintain oak savanna and provide quality wildlife habitat. Upland hardwood stands that are at least 20 years old and moderately to well stocked will moderately benefit from prescribed fire, which will reduce fuel loading, manage understory vegetation, and provide quality wildlife habitat. Prescribed fire would be of minimal benefit in younger stands, where the amount of fire should be limited in order to prevent scorch and mortality.

Table 11. Forest area by level of potential prescribed fire benefit for upland hardwood forest types in Central/West Texas.

	None/Low	Moderate	High	Total
		million acres		
Upland hardwood	0.7	5.0	4.3	9.9
Area near communities	0.4	2.7	1.9	5.0

In Central/West Texas, 4.3 million acres of upland hardwood forest have potential to highly benefit from prescribed fire, and 9.3 million acres have potential to at least moderately benefit. Annually, assuming a fire return interval of 10 years, approximately 0.4 million acres on average could highly benefit and 0.9 million acres could at least moderately benefit. Of the 9.3 million acres with potential to at least moderately benefit from prescribed fire, 4.6 million acres (0.5 million acres per year on average) would benefit communities.

Bottomland Hardwood Forest

East

Assuming a general goal of producing quality hardwood timber, prescribed fire use in bottomland hardwood forest should be limited but may be used to favor wildlife habitat.

Table 12. Forest area by level of potential prescribed fire benefit for bottomland hardwood forest types in East Texas.

	None/Low	Moderate	High	Total
		million acres		
Bottomland hardwood	2.1	–	–	2.1
Area near communities	1.6	–	–	1.6

Central/West

Prescribed fire use should be limited in bottomland hardwood forest to protect fire-sensitive species and riparian areas.

Table 13. Forest area by level of potential prescribed fire benefit for bottomland hardwood forest types in Central/West Texas.

	None/Low	Moderate	High	Total
		million acres		
Bottomland hardwood	3.2	–	–	3.2
Area near communities	1.9	–	–	1.9

Mesquite Woodlands

Mesquite woodlands occur in the Central/West Texas region. Historically, mesquite was restricted in range, and the main use of prescribed fire in mesquite woodlands is to reduce woody encroachment on grasslands. High benefit from prescribed fire is possible in open to moderately stocked mesquite woodlands, with outcomes of reducing woody encroachment and maintaining savanna to open grasslands. Closed canopy mesquite woodlands would receive moderate benefits from prescribed fire,

but limited surface fuels may make prescribed fire implementation difficult, driving up cost. Where successful, it would create openings for habitat diversity.

Table 14. Forest area by level of potential prescribed fire benefit for mesquite forest types in Central/West Texas.

	None/Low	Moderate	High	Total
		million acres		
Mesquite	–	1.6	19.7	21.4
Area near communities	–	0.4	3.5	3.9

Overall, 19.7 million acres of mesquite woodlands in Central/West Texas have potential to highly benefit from prescribed fire, and 21.4 million acres have potential to at least moderately benefit. With a fire return interval of 10 years, on average 2.0 million acres of mesquite woodlands in Central/West Texas could highly benefit from prescribed fire annually, and 2.1 million acres could at least moderately benefit. Of the 21.4 million acres with potential to at least moderately benefit from prescribed fire, 3.9 million acres (0.4 million acres per year on average) would benefit communities.

Shrubland

Shrubland in Texas is almost entirely in the Central/West Texas region. The main use of prescribed fire on shrubland is to maintain it as a more productive grass site for forage and to mitigate wildfire risk. Highly productive rangeland dominated by grass with shrub overstory would highly benefit from prescribed fire. Moderately productive shrubland with adequate to marginal fine fuels would moderately benefit from prescribed fire, in part due to the limitation of the low to moderate fine fuel load to produce the desired fire effects. Shrubland with poor to low productivity and limited to no fine fuels would see limited benefit from prescribed fire, with the widely patchy or lacking fine fuel load producing less than desired or no fire effects.

Table 15. Area by level of potential prescribed fire benefit for shrubland in Texas.

	None/Low	Moderate	High	Total
		million acres		
Shrubland	9.4	7.3	12.5	29.2
Area near communities	0.3	0.3	2.5	3.1

Overall, 12.5 million acres of shrubland have potential to highly benefit from prescribed burning, and 19.8 million acres have potential to at least moderately benefit. Assuming a 10-year fire return interval, approximately 1.2 million acres on average could highly benefit from prescribed fire annually, and 2.0 million acres on average could at least moderately benefit from prescribed fire. Of the 19.8 million acres with potential to at least moderately benefit from prescribed fire, 2.8 million acres (0.3 million acres per year on average) would benefit communities.

Grassland

Most of the grassland in Texas is in the Central/West Texas region. The benefit of prescribed fire on grassland primarily varies with productivity. Highly productive, moderately to well stocked rangeland dominated by grass would highly benefit from prescribed fire. Moderately productive, low to adequately stocked rangeland dominated by grass would moderately benefit from prescribed fire, in

part due to the limitation of the low to moderate fine fuel load to produce the desired fire effects. Under or poorly stocked grassland with poor to low productivity would see limited benefit from prescribed fire, with the widely patchy fine fuel load producing less than desired fire effects.

Table 16. Area by level of potential prescribed fire benefit for grassland in Texas.

	None/Low	Moderate	High	Total
		million acres		
Grassland	0.2	1.1	19.3	20.6
Area near communities	0.1	0.1	6.2	6.3

Overall, 19.3 million acres of grassland have potential to highly benefit from prescribed burning, and 20.4 million acres have potential to at least moderately benefit. Assuming a 3-year fire return interval, approximately 6.4 million acres on average could highly benefit from prescribed fire annually, and 6.8 million acres on average could at least moderately benefit from prescribed fire. Of the 20.4 million acres with potential to at least moderately benefit from prescribed fire, 6.2 million acres (2.1 million acres per year on average) would benefit communities.

Purpose, Limitations, and Considerations

This study is meant to provide a strategic-level view of the potential land area of Texas that could receive benefit from prescribed fire. It is a broad-brush, initial attempt at quantifying the number of acres in the state that could support prescribed burning given the ecology and typical management objectives of the various land types addressed. This study is not designed to identify particular areas to target for prescribed burning activities; it utilizes design-based estimates from a statistical sample that are appropriate for use over large areas, like the state of Texas. Neither is it meant to advocate for any particular amount of prescribed burning or changes in practice. It may, however, be used as a contextual backdrop to address prescribed burning strategies and policies in the state.

Further study is required to determine feasibility and implications of performing prescribed burning at this scale. Additional considerations for future study include quantifying the amount of prescribed burning that is currently taking place across the state each year, the capacity of licensed prescribed burners to handle additional loads, prioritization of different areas to maximize prescribed fire benefit, and the monetary value of both current and potential prescribed burning practice.

References

[1] Burrill, Elizabeth A.; DiTommaso, Andrea M.; Turner, Jeffery A.; Pugh, Scott A.; Menlove, James; Christiansen, Glenn; Perry, Carol J.; Conkling, Barbara L. 2021. The Forest Inventory and Analysis Database: database description and user guide version 9.0.1 for Phase 2. U.S. Department of Agriculture, Forest Service. 1026 p. [Online]. Available at web address: http://www.fia.fs.fed.us/library/database-documentation.

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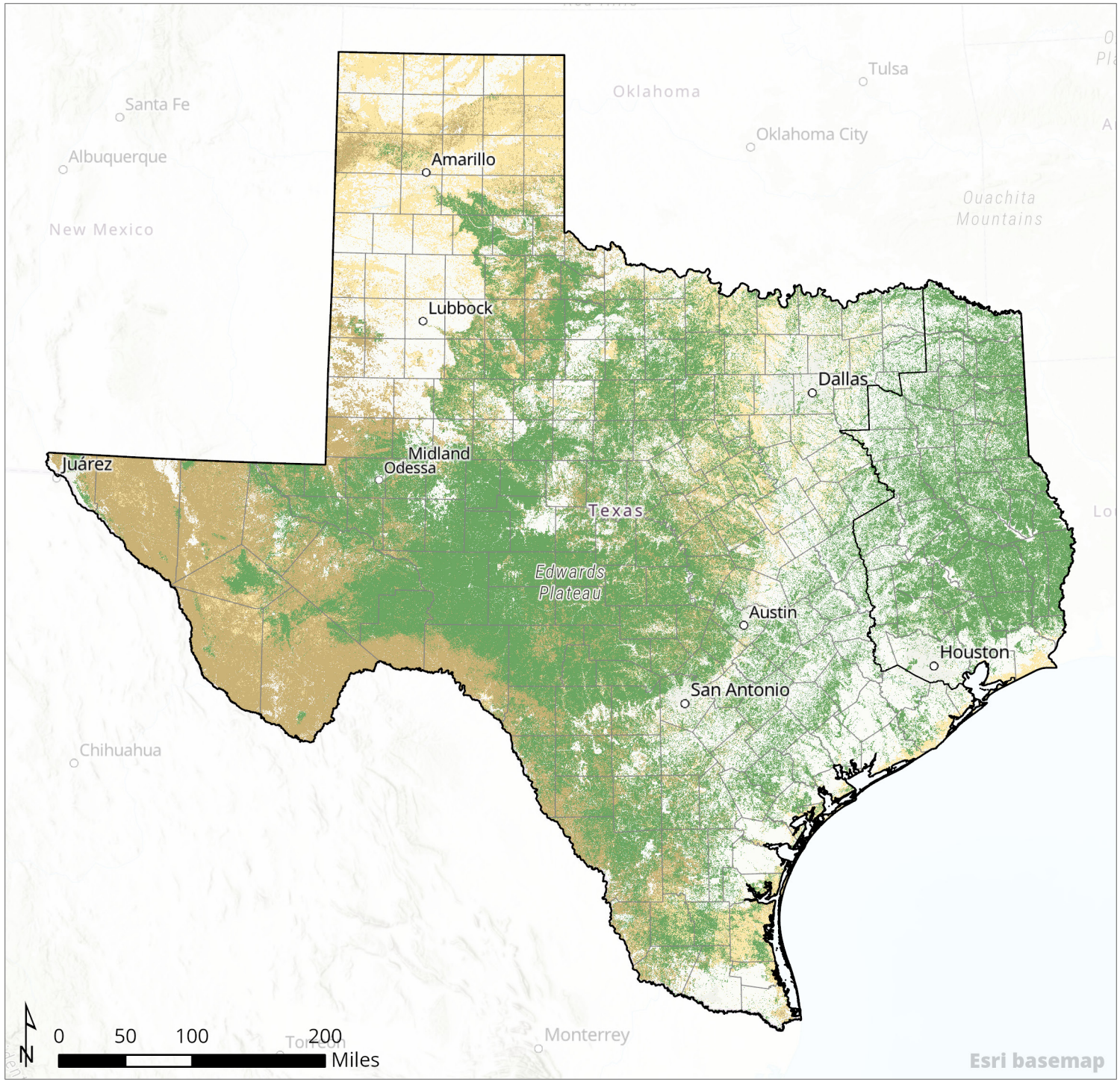
[2] LANDFIRE: LANDFIRE 2020 Existing Vegetation Type layer. (2022, June - last update). U.S. Department of Interior, Geological Survey, and U.S. Department of Agriculture. [Online]. Available: http://landfire.cr.usgs.gov/viewer [2022, December 19].

[3] R. Gray, personal communication, April 8, 2022.

Forest, Shrub, and Grass Cover in Texas



forest land is land with at least 10% canopy cover by trees of any size and that is at least an acre in size and 120 feet wide

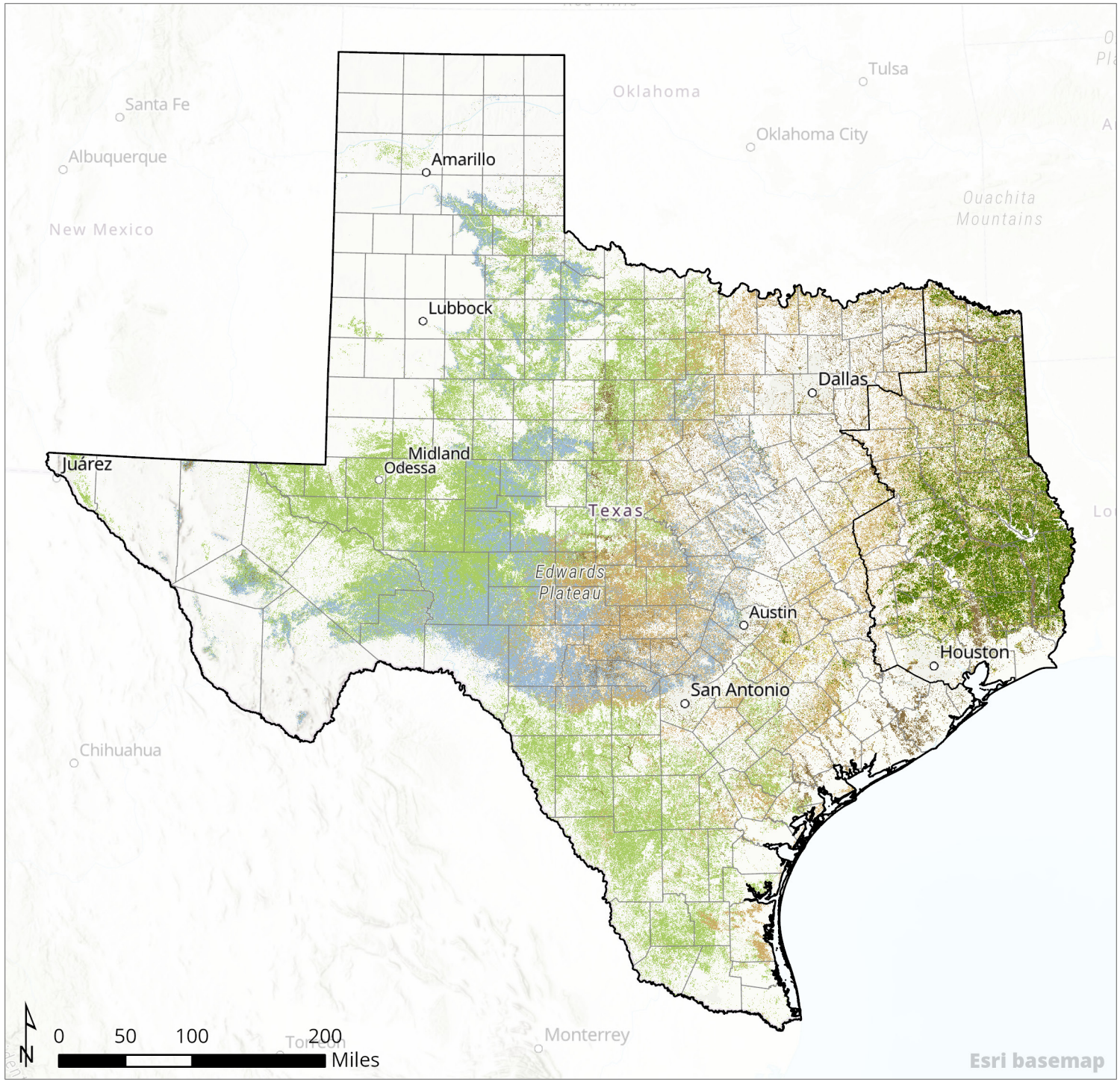
forest land modeled from FIA and other data; shrubland and grassland from LANDFIRE 2020 Existing Vegetation Type layer (www.landfire.gov)

Forest Inventory & Analysis
http://tfsweb.tamu.edu/fia

Map prepared by Rebekah Zehnder
Forest Analytics Department
2 December 2022

TEXAS A&M FOREST SERVICE

Major Forest Types in Texas



forest land is land with at least 10% canopy cover by trees of any size and that is at least an acre in size and 120 feet wide

forest types modeled from FIA and other data

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Map prepared by Rebekah Zehnder
Forest Analytics Department
19 May 2021

TEXAS A&M FOREST SERVICE