



L-A-D FOUNDATION

Since 1962

2020 Annual Report

About the Cover

COVER PHOTO: Fall 2017, Ball Mill Resurgence at Blue Spring Branch Conservation Area, Perry County. GREG IFFRIG

In the 1974 “Springs of Missouri,” Vineyard and Feder described “a group of unusual intermittent springs or resurgences” along Blue Spring Branch south of Lithium. More commonly, springs generate a persistent flow of water from underground, but Ball Mill Resurgence only functions as a spring for very short periods during and after heavy rainfall. At those times, rainwater drains into numerous sinkholes in the karst plain south of Ball Mill and quickly fills a network of underground channels. This water flows north toward Blue Spring Branch, increasing the pressure underground and eventually forcing water up and out through Ball Mill Resurgence.

On the exposed bluff above, weather cracks the rocks, with sharp pieces eventually falling into the sinkhole. When underground water pressure causes churning at the resurgence, this forceful movement tumbles the fragments, smoothing their surfaces and rounding the edges, hence the name Ball Mill.

Leo Drey purchased a 19-acre area containing Ball Mill in 1978 and donated it to the L-A-D Foundation; it became Ball Mill Resurgence Natural Area in 1979, and the L-A-D Foundation donated its lease of this Natural Area to the Missouri Department of Conservation (MDC). Then beginning in 2007, the foundation, through a generous grant from the Holcim Settlement Group, acquired adjacent land, providing a buffer to the natural area and an opportunity to re-establish native species on the Perry County karst plain, which was originally a combination of wooded stream valleys and uplands of mixed savanna and prairie. In six transactions with five neighbors, the L-A-D Foundation acquired 367 acres, all under the donated lease. With adjoining lands purchased by MDC, Blue Spring Branch Conservation Area now totals more than 560 acres (see pages 12-13).



Ball Mill after heavy rainfall. The resurgence is occasionally a powerful intermittent spring.

RYAN DIRNBERGER



Earlier this year the foundation completed a significant exchange of land and acquired a second similarly sized resurgence named the Devils Jump Off. GREG IFFRIG

ANNUAL REPORT

of the L-A-D Foundation

January 2021

TABLE OF CONTENTS

From the President	3
Pioneer Forest Management	4
<i>Timber Sales/ Pine Management/ Tuttle Brothers/ New Gates/ GIS Data</i>	
Land Consolidation	11
<i>Backcountry Acquisition/ Carter County Exchange/ Ball Mill-Blue Spring Consolidation</i>	
Research and Monitoring	14
<i>Regeneration Research/ Fen Classification/ Cave Mapping/ Leatherwood Creek</i>	
Stewardship and Recreation	17
<i>MoBCI Glade Restoration/ Stewardship Crew/ Trail Policy/ LSR Grant/ Bluff School</i>	
Outreach and Education	20
<i>Karst Documentary/ Grand Gulf/ Visits to L-A-D Lands/ Website/ Lost Town of Brushy</i>	
Grantmaking and Community Support	29
<i>Grant Recipients/ Old Dillard Cemetery/ Trail Map</i>	
Public Policy	33
<i>Greer Spring Cabins/ ONSR Roads and Trails/ Feral Swine/ MO Conservation Strategy/ Conservation Roundtable/ Hickory Canyons</i>	
Administration	38
<i>Strategic Plan/ New Funds/ Wayne Goode/ New Board Members/ Board and Staff Honors/ New Business Manager/ Foundation Manager Search</i>	
Appendices:	
<i>Map of L-A-D Foundation Lands</i>	46
<i>List of L-A-D Foundation Lands</i>	47
<i>List of L-A-D Foundation Trails</i>	49
<i>Map of the Trails of the Roger Pryor Pioneer Backcountry</i>	50
<i>Maps of Other Trails on L-A-D Foundation Lands</i>	51
<i>Glossary of Terms</i>	52

CONTENT: Articles were composed by the L-A-D and Pioneer Forest staff and by Denise Henderson Vaughn. Additional review was provided by L-A-D Foundation board members.

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The L-A-D Foundation

Founder: Leo A. Drey

The L-A-D Foundation is a Missouri private operating foundation dedicated to exemplary stewardship of Pioneer Forest and other natural and cultural areas and to scientific research, education, public recreation, and encouragement for projects and policies that have a positive influence on the Missouri Ozark region and beyond.

L-A-D Foundation Mission Statement

Leo Drey began acquisition of forest land in the Missouri Ozarks in 1951. The name Pioneer Forest may have been inspired by Pioneer Cooperage Company of St. Louis, the company that originally owned much of the land that was purchased in 1946 by National Distillers Products Corporation of New York, then in 1954 by Leo Drey. Drey added it to the forest land he already owned, and named it all Pioneer Forest. In 1962, Leo Drey established the L-A-D Foundation primarily to hold and protect areas of outstanding natural or cultural resource value in the Missouri Ozarks. In 2004, Leo Drey and his wife Kay donated Pioneer Forest to the L-A-D Foundation to be managed as an exemplary demonstration of conservative uneven-aged single-tree selection forestry and land stewardship.

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Clay Jensen, Forester

Forest Technicians:

Mike Adams, Eminence
Neal Christensen, Van Buren

From the President

This year of Covid was strange for all of us, but fortunately did not greatly disrupt our operations. Our offices in both Salem and St. Louis were closed for a time beginning in March and then reopened on a hybrid basis. Outdoors in Pioneer Forest the solitary or distanced nature of our work progressed as usual. We had to cancel our spring BBQ and turned to teleconference or Zoom for meetings, and greatly missed the usual in-person fellowship. We were pleased that we were able to celebrate the honoring of Forest Manager Jason Green as Missouri's Forest Conservationist of the Year by the Conservation Federation just before the shutdown.

After a year devoted to preparation of a new management plan for the forest and strategic planning for the foundation, we turned in 2020 to implementation of some of the most pressing plan elements. On the forest this entailed cutting more acres and one or two more trees per acre this year than before, coupled with careful monitoring and the start of a new research project to assess the results, now that our forest is fully stocked and we are faced with the challenge of maintaining its uneven-aged character through adequate natural regeneration. Our stewardship staff has spent more time on the forest than ever before, working on special ecological management areas to improve their health and biodiversity, while not neglecting needed projects on our natural areas.

When Leo and Kay Drey donated the forest to the L-A-D Foundation in 2004, the foundation suddenly became land rich but relatively cash poor to take on the responsibility of maintaining that landed estate and its operations in perpetuity. Over the years we developed accounting systems, human resources policies, and financial reserves more appropriate for a non-profit organization, but we were ready for another tune-up. This year, our L-A-D board and staff developed and approved a board-designated endowment fund and a land consolidation fund to continue building our reserves for long-term protection of our land and operations.

At the end of June we bid a sad farewell to our can-do business manager, Clare Holdinghaus-Ireland, who outdid herself bringing our highest priority projects to a point where they could be handed over to her able successor. Our new business manager, Jennifer Potratz, brings training and experience relevant to the broad range of our L-A-D programs and, like Clare, a deep commitment to our mission and to our culture of mutual respect and teamwork. Now we are preparing for another critical and equally sad transition as we lose our longest-serving current staff member, Liaison to the Board Greg Iffrig, who plans to retire by early May.

We had transitions also at the board level. Days before our October meeting, we received the devastating news that our longtime treasurer Wayne Goode had passed away. He was instrumental in the restructuring of L-A-D finances and in nearly all other decisions, especially after the 2004 gift of Pioneer Forest to the foundation. Director Ted Heisel, whom we had elected assistant treasurer in July, stepped up to the critical role of treasurer. We also were pleased to welcome two new directors, Adam Saunders of Columbia and Mike Smith of Washington, to the board.

We look forward to the time, hopefully in 2021, when we can resume fellowship in person among our board and staff and with our many partners.



Susan Flader
President, L-A-D Foundation

L-A-D FOUNDATION

PIONEER FOREST MANAGEMENT
LAND CONSOLIDATION
RESEARCH AND MONITORING
STEWARDSHIP AND RECREATION
OUTREACH AND EDUCATION
GRANTMAKING AND COMMUNITY SUPPORT
PUBLIC POLICY
ADMINISTRATION

Pioneer Forest Management



Ron Tuttle timber sale, 2013.
GREG IFFRIG

When this year began, no one could have foreseen the changes and challenges on so many fronts in just twelve months. New phrases and words have even been developed, such as “Covid,” “social distancing,” and “mask-mandate.” Fortunately, the operation of Pioneer Forest has been relatively normal, with a few significant developments.

When the CDC Covid advisories were issued in March, we closed the Pioneer office, except for the forest manager, and asked other staff who normally work there to work from home when not in the field. Daily communications are normally by phone, text, or radio in any case. In the field, our staff's work marking timber, supervising sales, painting boundary line, or engaging in stewardship practices is

usually alone or easily distanced. In fact, we harvested more than usual. Monthly staff meetings were moved outdoors or held by conference call.



Pioneer Forest Manager Jason Green looks out over one of the 2020 timber sale areas.

BRANDON KUHN

Our most significant challenges and changes came as a result of our 2017 Continuous Forest Inventory, our new forest management plan, and board/staff strategic planning in 2019. With our forest now fully mature after more than a half century of restoration, we realized we would have to open the canopy more to encourage adequate reproduction of oak, pine, and other species. That meant harvesting more acres per year—nearly 7,000 compared with our usual 4,000 to 5,000 acres in recent decades—which in turn would require more staff.

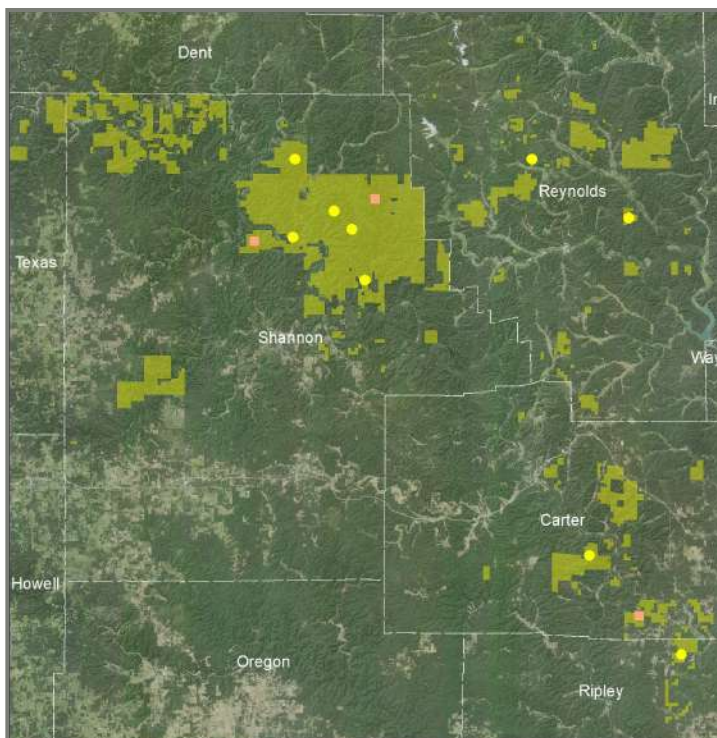
With board encouragement, this year we increased our total staff to eight; for decades staff had numbered two foresters and four forest technicians. The addition of Levi Bachman last year and Clay Jensen in January 2020 (both introduced in our 2019 annual report) not only increases our total staff by a third to manage increased harvest but now gives us six professionally trained staff, which significantly expands our capacity to meet a broadening range of management objectives, including increased silvicultural research and monitoring, ecological stewardship, and enhanced primitive recreation.

TIMBER SALES

Pioneer Forest currently has nine regular timber sales and three salvage sales working on the forest. Total harvest, including salvage sales, for 2020 includes 10.6 million board feet of sawtimber, 500,000 board feet of stave logs, and 4.7 million board feet of blocking. We covered 6,089 acres for the calendar year, including 800 acres of salvage.

Our sawtimber harvest increased by more than 2.5 million board feet compared to last year. This can be attributed to hiring staff to manage additional timber and salvage sales.

We met our harvest management goal of 5,500-7,000 acres per year in 2019, though just barely, by covering 5,559 acres. By adding foresters, we can consistently meet our harvest goals, encourage regeneration, and maintain the uneven-aged structure of the forest.



Timber Sales 2020: yellow circles depict timber sales, and pink squares show salvage sales.

NEW PINE MANAGEMENT AREA AT HIMONT

The historic range of shortleaf pine is the widest of all the southern yellow pine species. During European settlement, stands were estimated to cover between 70-80 million acres in 22 states. Today, stands dominated by shortleaf are estimated to cover around 6 million acres across the southeastern states based on Forest Inventory and Analysis data; this amounts to less than 10 percent of its historic acreage. In Missouri, the decrease in shortleaf pine acres is even more staggering. At the time of European settlement, shortleaf pine as a dominant or co-dominant species was found on approximately 6.6 million acres. Today, that acreage has decreased to around 500,000.

Although most of Pioneer Forest's ground is dominated by oaks, there are significant areas where shortleaf pine was historically a dominant or co-dominant species. Pioneer staff have known that the Himont area within the Roger Pryor Pioneer Backcountry, where our principal trailhead is located, presents a great opportunity for shortleaf pine management, including the use of fire to help secure reproduction. The area is flat to gently rolling, has good stocking of pine and white oak, which tolerate fire, and grows poor scarlet oak and black oak timber, which is susceptible to fire. Soils in the unit are good indicators for shortleaf pine. These include the Coulstone-Alred Complex, which is composed of a sandy loam complex at 1-5 inches; the Viburnum Silt Loam, which encounters clay at 6-18 inches; and the Tonti-Hogcreek Complex, which encounters clay at 8-20 inches. Pine thrives on sandy, slightly acidic soils. It also outcompetes early successional red oak species such as scarlet oak and black oak on sites with a heavy clay component. Generally, trees within the red oak group fare very poorly on soils with a heavy clay component, while shortleaf pine and white oak thrive.

We also have seen the pine regeneration potential on adjacent lands. Logging was conducted several years ago across the road from our Himont pine management site. During the logging operation, soil was exposed on landings and skid trails. Pine requires bare soil to regenerate, and pine seedlings have established in weedlike fashion everywhere the soil was exposed.

Pioneer Forest staff, along with the land stewardship coordinator, plan to manage this area specifically for pine with an admixture of white oak, using prescribed fire and logging to provide adequate light and to promote regeneration of both species. Our foresters are writing a management plan for the approximately 470-acre unit; it will detail Himont's history, the cutting history, pre-treatment timber cruise summary, timber marking protocol, timber management goals, and fire management goals. This document will help guide our management of the area for the next several years.

As fire is reintroduced on this landscape, other ecological benefits are expected, such as an increase in species diversity in the herbaceous layer, a reduction in stems in the red oak group, and areas of significant pine regeneration. The results should be instructive for other areas on the forest conducive for pine. The unit's location near a major trailhead and bordered by county roads also affords good opportunity for interpretive signage and tours.



BOARD FIELD TRIP TO HIMONT



Left to right, Pioneer Forest Manager Jason Green, Field Supervisor Matt Skaggs, Chief Forester Brandon Kuhn, Director Janet Fraley, Board President Susan Flader, and directors John Karel, Mike Smith, and Ted Heisel. JENNIFER POTRATZ

Beautiful fall colors and warm weather made October 22 a perfect day for a field trip to introduce new director Mike Smith and new business manager Jennifer Potratz to Pioneer Forest's landscapes and management practices. Forestry staff and seasoned directors provided an overview of historic logging in the Himont area.

Attendees learned how to think like a timber marker and anticipate the path of logging activity by assessing the terrain in each area and locating high-quality individual trees, including young stems, to leave.

Foresters gave an interactive demonstration of timber marking with paint guns, working in pairs, following drainages and ridges. Novices to paint gun operation were encouraged to practice marking selected trees on both the uphill side for chain saw operators and the downhill slopes for skidder drivers.

Everyone was informed and appreciative for the opportunity to gather in person. Thanks to Jason and Brandon for being fantastic hosts and facilitating discussions.

PROFILE: TUTTLE BROTHERS LOGGING

The Tuttles are not just great loggers, they're also great people.

Brothers Ron, Don, and Gary Tuttle were born and raised in Summersville, Missouri. With many family members working in the timber industry, including a grandfather who hauled logs with a freight wagon and an uncle who cut and split stave bolts, logging seemed like a good fit. After graduating high school in 1975 the oldest brother, Ron, began cutting cordwood for charcoal. He purchased his first log skidder in 1977; that same year his younger brother Don graduated high school. They soon went to work together doing small logging jobs and making use of the tops for cordwood. Two years later, the youngest of the three, Gary, joined the crew, and Tuttle Brothers Logging was formed.



Ron Tuttle. GREG IFFRIG

For years they used a two-ton truck with a cable boom loader. By the mid 1980s the Tuttles focused exclusively on logging. It was around this time that the brothers cut their first timber sale on Pioneer Forest. Russ Noah, a Pioneer technician, marked the timber, and Ron Harper held the contract with Pioneer. The Tuttles continued to log under Ron Harper's contract for many years, working under technician Steve Whitaker and later forest manager Terry Cunningham.

In the early 2000s sons Keith Tuttle and Jason Tuttle began working with their fathers, Ron and Don. Gary's son Waylon Tuttle soon followed. In

time, Jason Tuttle left the crew to pursue his own logging business, eventually partnering with his father Don. Jason and Don formed D&J Logging and went to work on Pioneer Forest under their own contract.



Gary Tuttle Logging Co. truck on Pioneer Forest, 2015. JASON GREEN

In 2007, Tuttle Brothers Logging was recognized as the first recipient of the Missouri State Logger of the Year award. They were nominated by MDC Forestry Regional Supervisor Tom Draper and former Forest Manager Terry Cunningham. In May of 2009, a major storm system swept through the Ozarks, laying down millions of board feet of timber. Pioneer Forest quickly issued salvage contracts to many additional logging crews. Tuttle Brothers Logging was one of those crews. They salvaged blown down timber for nearly three years. When the salvage was over, they began again to cut marked timber working for Pioneer foresters Jason Green and Brandon Kuhn.

The Tuttle family has logged on Pioneer Forest for some 35 years, and has done so steadily for around fifteen years. They have been asked on occasion to demonstrate tree felling or log handling techniques, always to the amazement of L-A-D board members and others, who greatly admired their skill. When asked why they prefer working for Pioneer Forest, Ron mentions how much he enjoys working with the staff. He says he feels like part of a family; when working for agencies it's all business, but there's a real family atmosphere at Pioneer Forest. Ron says, "The higher ups, even the board members treat us good, like family."

The Tuttles are highly respected by Pioneer staff, L-A-D Foundation board members, and many others in the forest management community. They are well known for consistently doing extremely high-quality work. The Tuttles are not just great loggers, they're also great people.

DON TUTTLE MEMORIAL

A long-tenured Pioneer Forest contract logger, Don Tuttle, lost his life in a logging accident on September 25, 2020. He was working on Pioneer Forest land near Ellington with his son and partner Jason Tuttle.



Don Tuttle.
PHOTO COURTESY OF CATHY TUTTLE

Don first worked on Pioneer Forest in the mid 1980s and for the last 15 years or so worked steadily on the forest. He was well known for doing excellent work and for his dedication and skill. He was all business when he was in the woods. He will be greatly missed by Pioneer Forest staff and all who knew him.

According to his obituary provided by Bradford Funeral Home, Donald Lee Tuttle ("Tutt") was born March 13, 1959, in Houston, Missouri to Delmer and Ruth (Stark) Tuttle. He married Barbara Jordan in 1982 and they had three children—Angela, Jason, and Melissa—and fourteen grandchildren. He didn't often show his feelings but he loved his family and was proud of every one of them.

Don loved being outdoors and worked in the timber all his life, first with his brothers and most recently with his son. Although sometimes he threatened to quit, there was not another job he would have rather done.

He also loved hunting and spending time on the Current River, whether camping with family or friends, four-wheeling, or just watching canoers.



NEW STEEL GATES ADDED ON PIONEER FOREST

From the onset of his purchase, Leo Drey wanted to keep his forest open for primitive public use and enjoyment. Over the decades, Pioneer Forest has added several hiking trails, one equestrian trail, and an interpretive drive at the Virgin Pines in Shannon County. With the exception of the interpretive drive (limited to the county road) and equestrian trail, all other trails are walk-in only. The Roger Pryor Pioneer Backcountry is our largest ownership and has the most trails. One purpose of the Backcountry is to provide recreational users an experience in nature, free from motorized intrusion.

Over the years, we have seen gradual increases in motor vehicle use on county roads and on our private access roads. The opening of Echo Bluff State Park has further increased interest and use of the forest. To protect user experiences, we have now installed five gates in the Backcountry, which help to protect our extensive loop of primitive trails in the Brushy Creek area from unauthorized motorized intrusions. One of those gates has had to be reinforced. The gates have been custom manufactured, with most constructed and installed by our own staff.

We also installed a gate on our Kellogg tract in Reynolds County adjacent to our Lily Pond Natural Area. Before its purchase by Pioneer, this area was used as a local dumping ground for many years. Our staff removed more than 100 tires, and a heavy equipment operator loaded more than 11 tons of trash into a dumpster. Shortly after the cleanup was complete, dumping began again at the site. To protect from further dumping, we installed a custom gate. This gate and cross-bracing were illegally cut off and removed during Labor Day weekend by persons unknown. Our staff immediately responded the next week, reinstalling the gate and cross-bracing, as shown in the photo below. We intend to protect our property.



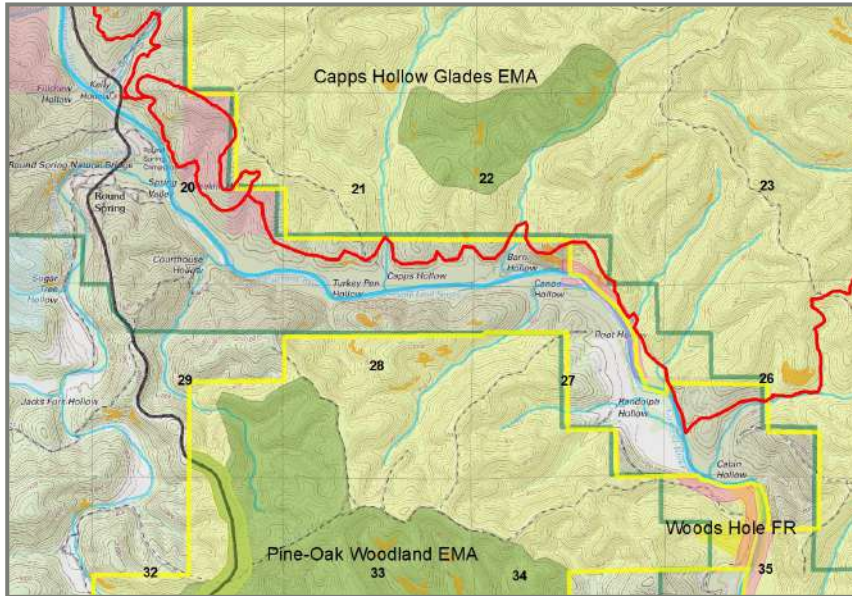
COLLECTING AND SHARING GIS DATA FILES IMPROVES OUR MAP-MAKING

The L-A-D Foundation has increased its capacity to keep track of land boundaries, ownership transfers, and locations with special designations. Using Esri's ArcGIS (Geographic Information System) mapping software, we combine publicly available map data with private data developed by staff to illustrate a range of projects: creating map slideshows for meetings, documenting historical sites on our land, or recording timber sales. Precise mapping benefits our land consolidation planning in showing our ownership and boundaries against the landscape.

Staff members regularly refer to our large scale wall map that shows the entire Pioneer ownership, including details such as special use areas and natural communities such as glades. Conversations around that map have become frequent during Pioneer's annual BBQ and at meetings such as the annual Missouri Natural Resources Conference. In the field, workers can easily look up these same features in a binder containing more than three dozen 8.5"x11" township maps detailing our property.

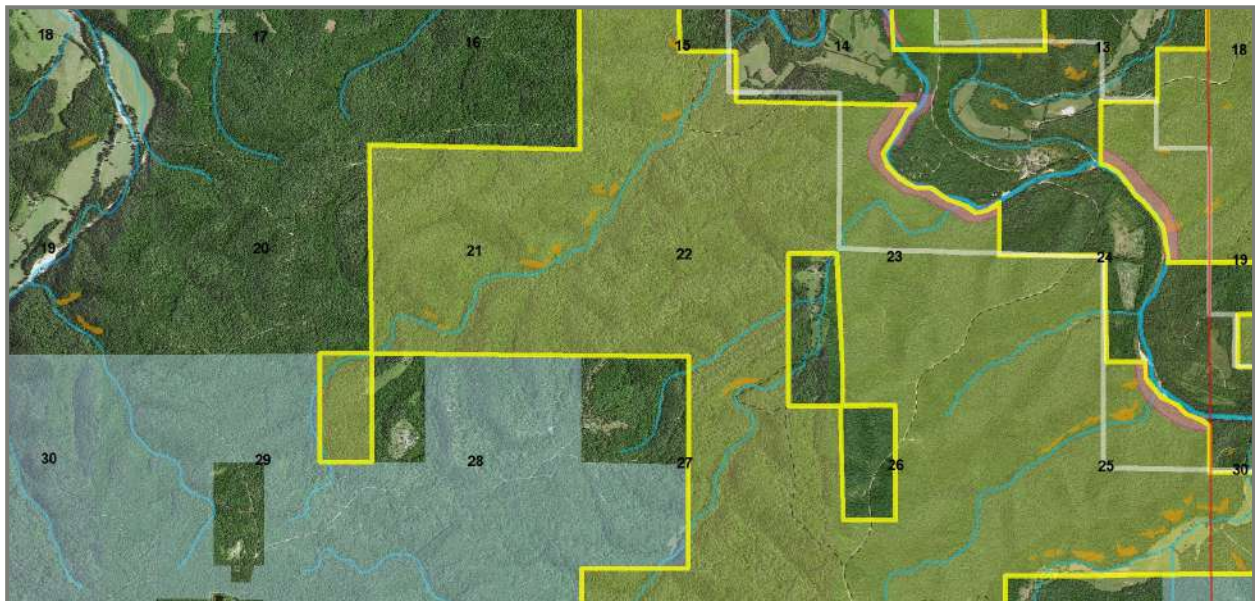
Mapping software uses data layers, or shapefiles, each of which shows a specific type of feature. These are layered on top of a base map, typically a USGS topographic map or a photographic image captured by plane or satellite. Publicly available shapefiles include roads, county lines, township lines, town boundaries, government land ownership, and natural features like streams, sinkholes, glades, losing streams, and springs.

We also are grateful to be able to use shapefiles that are not publicly available but provided by various organizations including MDC, Missouri State Parks, Mark Twain National Forest, USGS, Ozark Trail Association, and other groups. They have shared shapefiles showing state-designated natural areas, damage by the 2009 derecho windstorm, trails, trailheads, and natural heritage features.



On the topographic base map of the Round Spring area along the Current River, our mapping shows Pioneer Forest boundaries (yellow line/yellow shading), Ozark Riverways boundaries (green line), easement areas (pink shading), glades (orange shading), streams (blue line), two Ecological Management Areas (EMAs-green shading), a Forest Reserve (FR-yellow shading), and the Current River Trail (red line).

Our staff members have developed shapefiles for our property boundaries, land acquisitions and sales, timber sales, burn units for prescribed fires, continuous forest inventory (CFI) research plots, forest reserves, ecological management areas, and easement lands within the Ozark National Scenic Riverways.



This aerial photo map of the Upper Current near Cedar Grove shows Pioneer Forest land in yellow. Missouri Department of Conservation land is in blue, and the Ozark Riverways park boundary is outlined in grey.

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PUBLIC POLICY
ADMINISTRATION



Slender Mountain Mint summer bloom at Blue Spring Branch Conservation Area. GREG IFFRIG

Land Consolidation

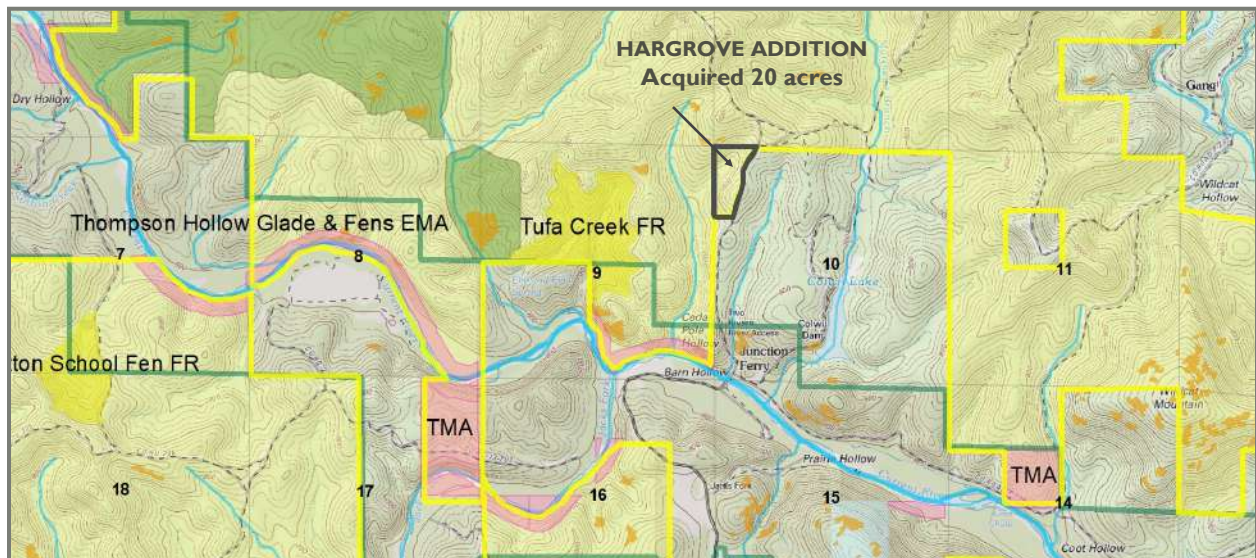
The L-A-D Foundation continues to seek opportunities for consolidation of its land holdings. This means acquisitions to fill in boundaries, reduce boundary mileage, and rationalize natural areas and reserve boundaries. It also means trade or sale of smaller isolated tracts that are inefficient to manage and have relatively little resource value.

In September, Pioneer and L-A-D staff gathered in Salem for an entire day to update the comprehensive consolidation plan for Pioneer Forest lands located in 38 townships in Carter, Dent, Reynolds, Ripley, Shannon, and Texas counties, and other lands, most of them designated natural areas, also owned by the L-A-D Foundation in other counties.

All foundation lands were reviewed against data within Pioneer Forest's and L-A-D Foundation's ArcGIS map files, including scenic easements along the Current and Jacks Fork Rivers and other lands under conservation management by state, federal, and other organizations. In early October the board and staff adopted the updated consolidation plan as we continue to look ahead.

ACQUISITION WITHIN THE ROGER PRYOR PIONEER BACKCOUNTRY

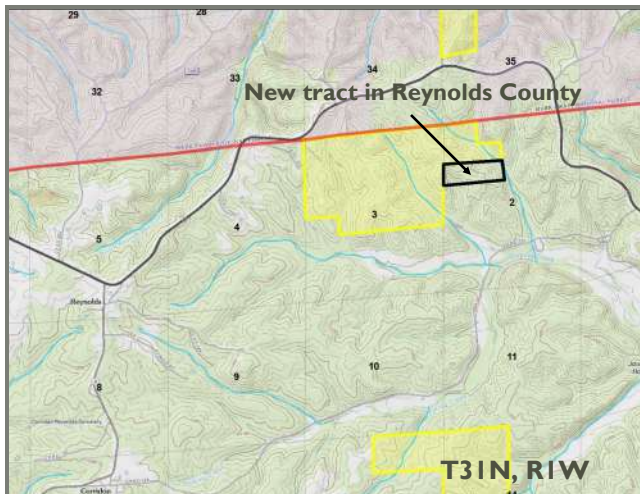
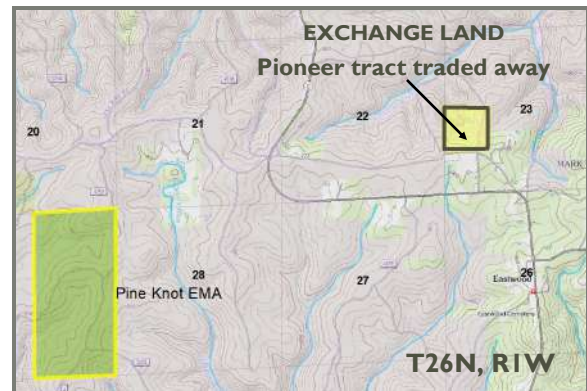
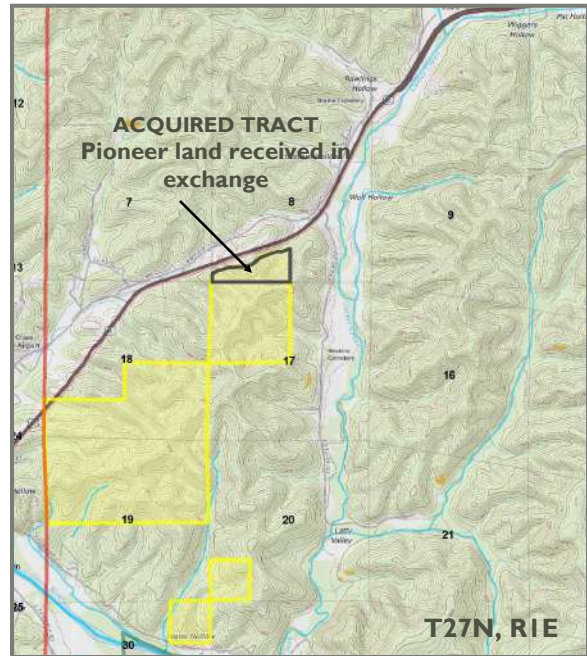
Brent Hargrove owned 20 acres bordered on the north and west by Pioneer Forest and located adjacent to Shannon County Road P-235 (see map below). The tract sits on a high point above Barn Hollow to the east and Cedar Pole Hollow to the west. Following his death, his sister called and offered the property to Pioneer Forest. The timber appears to be in good condition and has not been logged recently. The acquisition of this property reduces boundary line maintenance and helps to protect watersheds less than a mile from the Current River.



EXCHANGE OF LANDS IN CARTER COUNTY

Near Eastwood in Carter County is an isolated 30-acre tract of Pioneer Forest surrounded on three sides by the Mark Twain National Forest (shown lower right map, in Section 23). Staff have agreed for some time that this property ought to be part of the national forest, but it is difficult for the US Forest Service to buy or sell small tracts of land. Exchanges are easier.

Then Pioneer staff learned that a private landowner in Carter County who had long been seeking to acquire a small tract from the Forest Service in order to consolidate his own farm also happened to own an isolated 46-acre tract along Highway 60 near Van Buren adjoining Pioneer (see upper right map, in Section 8). Why not do a three-way land swap? Pioneer could trade its isolated 30-acre tract to the farmer for his 46 acres. He could then trade the former Pioneer land to the Forest Service for the parcel he needed for his farm, and the Forest Service would end up with a tract that provided better access to some of its own land. The three parties readily came to agreement on terms, and Pioneer gained land that provides permanent access from Highway 60 to 718 acres that were otherwise difficult to access. All three parties were winners.



ACQUISITION IN REYNOLDS COUNTY

We were able to buy 40 acres that shares Pioneer Forest's property boundary for one-half mile, joining an existing 474-acre tract in Reynolds County. This property lies just south of Highway 72, as shown on the map to the left, and has good timber.

BALL MILL RESURGENCE NA/BLUE SPRING CA CONSOLIDATION

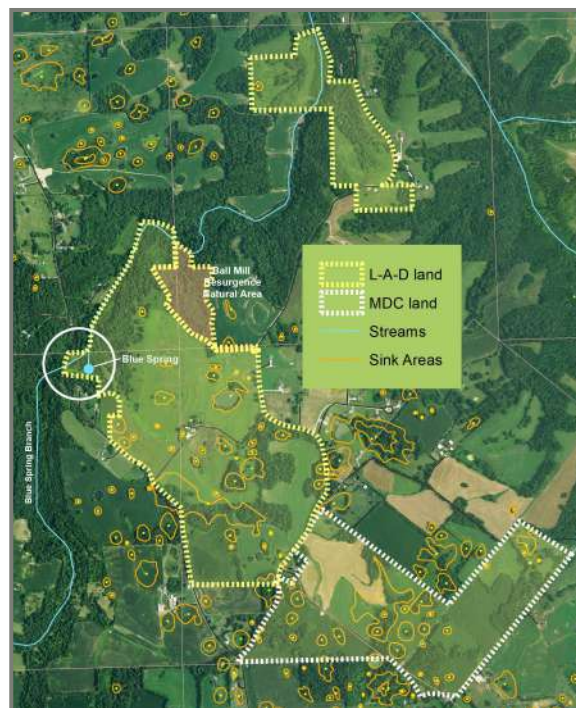
On March 13 the L-A-D Foundation closed on a small land exchange with Leroy Mitchell, a neighbor in Perry County. Mitchell had attended a 2019 L-A-D event in honor of Jerry Vineyard, former deputy state geologist and L-A-D director, who had persuaded Leo Drey to acquire and protect the Ball Mill Resurgence, the genesis of L-A-D's interest in the area. Mitchell met with several foundation board members and staff hoping to trade a parcel of his land along Blue Spring Branch to L-A-D in exchange for a small strip of previously farmed upland next to his home. That conversation continued over several months.

In the exchange, the foundation received a 4.91-acre parcel of high conservation value along Blue Spring Branch; it includes another significant resurgence named Devils Jump Off very near L-A-D's Ball Mill Resurgence Natural Area. Also included is a sizeable bluff, the namesake spring for Blue Spring Branch Conservation Area, and a critical portion of both sides of Blue Spring Branch, where waters from Blue Spring exit from Berome Moore Cave into the stream.

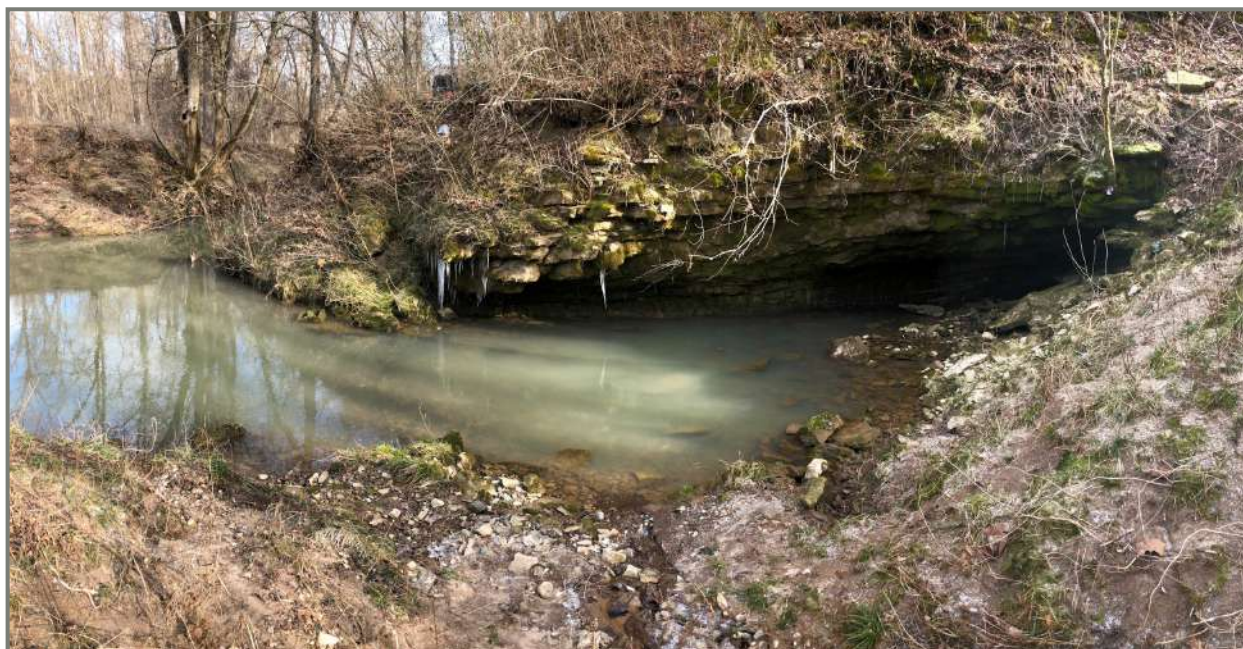
Missouri is often referred to as the Cave State, and Perry County contains at least 666 known caves. Among them are the two longest mapped caves in Missouri: Crevice Cave, more than 30 miles, and Berome Moore Cave, more than 22 miles. This acquisition has further enhanced a remarkable complex of karst features in one of the most important karst regions in the state and one of the most concentrated karst regions in the nation.

All the land that L-A-D has acquired here in the last decade has been added by donated lease to MDC's Blue Spring Branch Conservation Area, which includes dozens of sinkholes, four permanent springs, karst windows, caves, two significant and two smaller resurgences, and bluffs along Blue Spring Branch. The natural vegetational communities are equally diverse and are undergoing restoration by MDC. L-A-D, MDC, and other partners hope additional county landowners and citizens will be inspired to join our efforts to protect groundwater quality and restore native vegetation in this important karst area.

A 20-minute documentary, "Karst in Perry County," by Denise Henderson Vaughn was encouraged and funded in part by L-A-D and is now available for viewing on our website at <https://ladfoundation.org/perry-county-karst>.



L-A-D and MDC property in Perry County, with L-A-D's new area shown inside the white circle.



Blue Spring, Perry County, acquired in 2020 as part of Blue Spring Branch Conservation Area. GREG IFFRIG

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Technician Mike Adams collecting measurements for the CFI.
L-A-D FOUNDATION ARCHIVES

Research & Monitoring

Pioneer Forest tracks research and data collection on its lands, including Continuous Forest Inventory (CFI) data which has been collected on the forest since 1952. That long-term dataset has been used for a variety of inquiries regarding management of the oak, hickory, and pine forests of the Missouri Ozarks. We have always encouraged others to also conduct research on these lands, and a wide variety of studies have been completed by students and staff of colleges and universities, and other organizations.

Following up on one of the goals from the strategic plan, we provided funding assistance this year for a two-year research project with the University of Missouri to analyze Pioneer's long-term dataset in order to determine whether current increased harvest levels on Pioneer Forest are sustainable based on regeneration through time. This latest research effort follows others conducted on Pioneer Forest lands to continue to provide useful comparative information on the growth and yield of conservatively managed forests.

Also currently underway is a fen classification project being conducted jointly by Mark Twain National Forest and the University of Missouri, along with Springfield organization NatureCITE, which is directed by Dana and Justin Thomas. Soil and vegetation data are being collected from two sampling plots on Pioneer Forest. These are part of a larger sampling of 29 plots on Missouri fens.

Volunteers from caving organizations have explored and worked on caves on L-A-D Foundation and Pioneer Forest land for decades. The result has been a regularly updated record of caves and their location. Some of these caves have been mapped. Despite the long-term nature of their inventory work, cavers still today add new information. This year we report a large, new cave found on Pioneer Forest.

We also report on investigations of geology and cultural heritage at Pioneer Forest's Leatherwood Creek area that are important for other organizations and contribute to our knowledge of this special area.

RESEARCH ON PIONEER FOREST HARVEST AND REGENERATION

On August 1, 2020, L-A-D Foundation/Pioneer Forest entered into a two-year research contract with the University of Missouri to sponsor master's degree research under the direction of Dr. Benjamin Knapp in the School of Natural Resources. The project is entitled "Are current harvest levels sustainable? Describing forest regeneration through time across Pioneer Forest."

Pioneer Forest volume and growth has changed over the decades. Pioneer now has more sawlog volume than at any other time during its entire history of ownership by Leo Drey and then the L-A-D Foundation. The management system aims at an approximate 20-year cutting cycle. However, it has been more than 20 years since previous entry on most acres due for harvest, and sawlog volumes continue to increase, so it takes longer for each crew to move across each acre. The most recent Continuous Forest Inventory (CFI) data have raised concerns about the balance of regeneration and growth. One of the major objectives of the forest is to maintain it in uneven-aged character. A lack of successful advanced reproduction will prohibit the development of new age cohorts, risking the forest transitioning to an even-aged character.

Previous research from the Missouri Ozarks has helped identify factors affecting regeneration in upland oak forests. Recommendations for maintaining regeneration using uneven-aged methods include reducing stand density every 20 years to a basal area of 50 square feet per acre to allow enough growing space for new trees (Larsen et al. 1999). Pioneer Forest also has specific sites and CFI plots that appear to have had regular harvests and volume removal, and these have maintained multiple age classes through successful regeneration. Previous studies have shown that oak regeneration is affected by site factors, with greater establishment occurring on low-quality sites (Kabrick et al. 2014). Because of this, the harvest density or cutting cycle required to maintain regeneration may vary across sites, with low-quality sites being more flexible due to inherent advantage to oak regeneration.

By funding this research, Pioneer Forest hopes to address the following study questions:

1. How has tree regeneration and recruitment changed through time across Pioneer Forest? The analysis will summarize the number of trees by species in each size category through time. Analysis for the midstory will use 448 nested CFI plots, but the understory analysis will be limited to one hundred 1/50-acre plots where trees less than 1.6" dbh have been sampled since 1992. This will be the first study of that data.
2. Do site factors such as slope position, aspect, and ecological land-type affect regeneration? The researchers will model changes in tree density through time-based, on-site factors, using stand density in a given year as a covariate in the model. The study will look for relationships between stand density and regeneration density in relation to site quality.
3. Does operational timber harvest to different levels of stand density affect regeneration? Researchers will identify years of harvest, intensity of harvest, and change in density for each plot. Finally, researchers will evaluate the number of trees in the midstory and understory size classes through time in relation to harvest intensity and site factors.

The project will be completed in 2022 with presentations at the Missouri Natural Resources Conference and regional and national meetings and at least one peer-reviewed journal publication.

For 2020, \$30,000 has already been committed. An additional \$30,000 will be budgeted for 2021. The total project budget of \$60,000 will support a master's thesis stipend plus insurance for two years. Funding includes travel costs to visit sites for data collection and travel to conferences.

FEN CLASSIFICATION PROJECT

An Ozark-wide analysis of fens seeks to classify further this array of groundwater-fed wetland natural community types. A joint project involving Mark Twain National Forest, NatureCITE, and the University of Missouri is pairing soil samples with vegetation communities resulting in the creation of new soil series, the first of its kind in Missouri fens. Rough Hollow Fen on Pioneer Forest's Leatherwood Creek Forest Reserve was included for two of 29 sample points. Fens are biologically rich and routinely harbor relic plant species due to their constant influence by groundwater near or at the surface.

Two plant species were added to Missouri's known flora by Justin Thomas during this project. Wiregrass sedge (*Carex lasiocarpa*) was found at two fens and elliptic spikerush (*Eleocharis elliptica*) was found at the majority of the fens surveyed, including the foundation's Rough Hollow Fen. It is now also known that multiple fens have sustained loss of soil post settlement, presumably for small-scale agricultural use.



Garrett McKee, Kyle Steele, and Dennis Meinert collecting a soil sample from Rough Hollow on Pioneer Forest's Leatherwood Creek Forest Reserve. NEAL HUMKE

CAVE MAPPING ON FOUNDATION LANDS

A new, large cave was recently discovered in the Roger Pryor Pioneer Backcountry and is currently being mapped by the Cave Research Foundation and Meramec Valley Grotto. Many cave salamanders have been found there, and new passages are still being surveyed. During the most recent work in December an additional seven new caves were discovered. Our knowledge of karst features and the biological elements that they harbor is increasing over time with the work of these dedicated volunteers. According to Dan Lamping, president of the Missouri Speleological Survey, 183 caves on L-A-D Foundation and Pioneer Forest lands are currently recorded in the Missouri Cave Database.



Little Blair Creek Cave. DAN LAMPING

BEDROCK IN LEATHERWOOD CREEK IS COMPARED TO THE SAME EXPOSURES IN ELEVEN POINT RANGER DISTRICT ON THE MARK TWAIN NATIONAL FOREST

Geologic information from Pioneer Forest lands is being used as a reference for exposures of matching rock formations on the national forest. Earlier this year Dennis Meinert and Garrett McKee of the Mark Twain National Forest observed and geo-referenced changes in the exposed sedimentary rock for a larger Mark Twain National Forest study. Field data will aid in the accuracy of mapping geology, soils, and plant communities as part of the Terrestrial Ecological Unit Inventory.

Land in this area is also being studied for qualification as a Missouri Natural Area, including land on Pioneer Forest and on adjacent lands recently acquired by the Missouri Department of Conservation at Allen Branch, a tributary of the Jacks Fork.



Rock outcrop exposure. GARRETT MCKEE, UNIVERSITY OF MISSOURI

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*Shortleaf Pine-Oak Woodland
Ecological Management Area.*
NEAL HUMKE

Stewardship & Recreation

The board and staff agreed during the strategic planning sessions that continuing our land stewardship initiatives for glades, woodlands, and invasive species control is essential and helps to fulfill the mission of the foundation. These efforts will be enhanced through the addition of a staff ecologist and a seasonal crew leader, positions that we hope to fill in the coming year.

Glades are typically small openings along hillsides in the Ozarks with a naturally more diverse ground flora. Recent grants we have received from the Missouri Bird Conservation Initiative have allowed our seasonal crew to concentrate restoration on several small glades where we reduce cedar encroachment before beginning prescribed fire management. Successful efforts are proving important for stimulating long-dormant prairie grasses and forbs, and for restoring habitat for prairie warblers and habitat for tall larkspur, which occurs along the interface of woodlands and glades.

Our seasonal stewardship crew provides a unique and ongoing opportunity for young conservationists to work on the land and become familiar with Missouri forest and woodland ecosystems, the operations of Pioneer Forest, and use of special equipment and techniques. They come from many other states and go out carrying their experience here in Missouri and in our organization far and wide. Beginning next year we are looking forward to receiving funds from a landscape scale restoration grant from the US Forest Service through the Missouri Department of Conservation, which will allow us to continue initial work toward clearing Eastern red cedar from glades and expanding our invasive species control efforts, all for the restoration of natural communities.

We have begun following new guidelines for conducting timber harvest within our trail corridors. Our staff, working with our contracted logging crews, are helping us to better manage trails and timber sales to be more compatible and sustainable. We also benefitted this past year from the volunteer work of our partners, the Backcountry Horsemen of Missouri, at Bluff School along the Current River.

MISSOURI BIRD CONSERVATION INITIATIVE GRANT RESTORES DOLOMITE GLADE

In June the L-A-D Foundation received a second grant from the Missouri Bird Conservation Initiative (MoBCI) to restore a 33-acre dolomite glade on Pioneer Forest at the Tall Larkspur Ecological Management Area near Welch Lodge in the Ozark National Scenic Riverways. With historic disturbances at the turn of the twentieth century followed by decades of fire exclusion, Eastern red cedar has come to dominate most glades in the Ozarks. Cutting and pile-burning the red cedars combined with regular prescribed burning brings the herbaceous glade vegetation back to life. This increases insect abundance, which fuels native birds as they raise their offspring.



Prairie warbler. SUSAN FARRINGTON



A restored dolomite glade on Pioneer Forest. NEAL HUMKE

Work on this grant began this fall and benefits glade, shrubland and woodland bird species such as prairie warbler, blue-winged warbler, chuck-will's-widow, Eastern whip-poor-will, Eastern wood pewee, field sparrow, red-headed woodpecker, white-eyed vireo, wild turkey, and yellow-breasted chat.

Research in the Ozarks shows that prairie warblers are 27 times more abundant on glades managed with prescribed fire and mechanical thinning. Pioneer Forest lands on this glade join the NPS Ozark National Scenic Riverways, and the combined area is jointly managed with the National Park Service through the use of prescribed fire.

SEASONAL STEWARDSHIP CREW

This fall a new five-person seasonal stewardship crew began a six-month long term on Pioneer Forest and other L-A-D lands. Crew members are from Missouri, New York, Tennessee, Utah, and Wisconsin. They will spend most of their time completing work on the MoBCI grant that was announced in June. They are constructing firelines, implementing prescribed burns, restoring glades, and managing exotic invasive species while learning about Ozark ecology, natural area management, and the tools and techniques to accomplish conservation goals. Crew members come with diverse backgrounds, many having previously worked in seasonal conservation positions. The experience they receive with the L-A-D Foundation helps to build their careers. Many have gone on to graduate school or continued working in natural resource management fields or both. Several of our program alumni are currently in key full-time conservation positions in Missouri.



L-A-D Foundation Stewardship Crew 2020-2021: Joseph Dobbins, Ben Thomas, Melcolm Crutchfield, Emily Owens, and Eric Pursifull restoring a glade at the Tall Larkspur Ecological Management Area. NEAL HUMKE

This year the crew has also spent a week in Perry and Ste. Genevieve Counties assisting with trail maintenance at Hickory Canyons and with eradicating exotic invasive species at Ball Mill Resurgence, part of Blue Spring Branch Conservation Area.

FORMER FIRE CREW MEMBER RECEIVES NATIONAL PARK SERVICE AWARD

In August, Martha Maciasz, 2019-2020 L-A-D fire crew member, and the Sierra Institute received the 2019 Wes Henry Excellence in Wilderness Stewardship Award from the National Park Service. Martha has been crew leader with the Sierra Institute's Wilderness Fuels Crew for two seasons working in Lassen Volcanic National Park in northern California.

"Having worked with Martha, I am not surprised that she has led a successful team. She brought a high degree of integrity, safety, and production to our crew," said Land Stewardship Coordinator Neal Humke.

NEW TRAIL POLICY

Pioneer Forest staff have drafted a new trail management policy to address issues where logging directly impacts trail corridors and the trail tread. Prompted by logging damage to a portion of the new Current River Trail, the new policy outlines provisions of L-A-D's lease of the trails of the Backcountry to Missouri State Parks, describes the trail corridor and tread, and establishes protocols for logging and skid trails in the vicinity of hiking trails.

When staff encounter a trail during a timber sale operation, they have several steps to follow, including communication with partners, pre-harvest trail marking, logging standards within the trail corridor, minimizing skid trail crossings where possible, post-harvest follow-up work, and outreach and education with partner organizations. The components of this trail policy will help manage trails and timber sales more effectively where both interact. Though Pioneer Forest's primary activity is sustainable timber management, it is a multiple use forest and requires careful planning for logging in areas with trails.

L-A-D FOUNDATION INVITED TO PARTICIPATE IN HEART OF THE OZARKS LANDSCAPE SCALE RESTORATION PROJECT

The Missouri Department of Conservation has received a landscape scale restoration grant from the US Forest Service to fund conservation work in a 17-county region of the Ozarks. The L-A-D Foundation could receive up to \$180,000 for work to be completed on our lands in the Current River Conservation Opportunity Area over the next three years. This grant will fund Eastern red cedar removal from glades, exotic invasive species treatment, fire line construction, and prescribed fire implementation on our ecological management areas to restore glade and woodland natural communities. Much of the initial glade restoration work proposed in the 2019 Pioneer Forest Management Plan could be completed. Work will begin in 2021 and extend into 2023.

The larger grant to MDC will help fund the Scenic River Invasive Species Partnership, a joint collaboration to address exotic invasive species in the Current, Jacks Fork, and Eleven Point River watersheds. L-A-D is a founding member. It also will fund similar ecological restoration work and development of forest stewardship plans on private lands, as well as glade and woodland thinning on MDC lands.

BACKCOUNTRY HORSEMEN COMPLETE WORK ON BLUFF SCHOOL FENCE

Using a national grant from the Backcountry Horsemen of America, volunteers from the Backcountry Horsemen of Missouri and Pioneer neighbors, the Howells, removed the deteriorating wooden plank fencing at Bluff School and replaced it with a welded pipe fence.

The result is a much less visually intrusive fence that provides protection for the historic school building. The grant covered the cost of materials. The completed project includes a walk-in passage that is ADA compatible. The nearby Howell family, owners of Big Creek Trail Ride, loaned a large welder, generators, grinders, pipe, and heavy equipment trailers to transport materials and equipment to the school.

The L-A-D Foundation and Pioneer Forest began a series of contracts for building and roof repair in 2008 and most recently have encouraged volunteers from the Backcountry Horsemen organization to work on specific projects. Similar rural Ozark schools were constructed between 1874 and 1940. The listing of teachers at Bluff School runs from 1928 to 1952.



Replacing exterior fence at Bluff School.

PHOTO COURTESY OF BACKCOUNTRY HORSEMEN OF MISSOURI

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Outreach & Education



*Missouri Prairie Foundation
members tour Pioneer Forest.*

JENNIFER POTRATZ

All of our lands directly and indirectly provide for an array of benefits to the public. Outreach and education allows the opportunity for those benefits to reach more people. This aspect of our work received a great deal of attention in our most recent strategic planning process; all of us would like to do more.

Pioneer Forest provides the public with a working model of conservative uneven-aged forest management using the method of single-tree selection timber harvest, with many opportunities for researchers to compare almost seven decades of forest-wide data on growth and productivity. In addition to being a working forest, Pioneer's large Roger Pryor Pioneer Backcountry provides an extensive trail system open to the public for non-motorized recreation and exploration. L-A-D Foundation lands that are not managed for timber production as part of Pioneer Forest include examples of Missouri's rich natural and cultural heritage. These areas are available for public use through donated leases to state agencies. The activities described in this section are the best examples of our work on these lands during the past year.

We were able to support the development and completion of a documentary video about Missouri's Perry County karst region. On our Oregon County property at Grand Gulf the staff of the Missouri State Park System developed and installed a new series of eight interpretive panels dedicated in October. Our website continues to be improved, and just this year we have begun to monitor statistics that show significant growth in the number of visits. In November, our retired forest manager Terry Cunningham organized a team of GIS specialists and L-A-D staff to document the remains of the former mill town of Brushy in the heart of the Pioneer Backcountry.

We will continue these important outreach activities and consider new ways to document and disseminate information as we seek new audiences online and on the ground.

L-A-D-FUNDED KARST DOCUMENTARY IS NOW ONLINE

"Karst in Perry County," an 18-minute documentary video encouraged and funded in large part by the L-A-D Foundation, was completed early this year. It is now available for viewing on the foundation website.

This video showcases Perry County's karst features—caves, springs, sinkholes, and sink basins—in context with the community living on the karst plain. The cave-dwelling grotto sculpin was federally listed as an endangered species, and the documentary video shows how residents in the county were initially alarmed, concerned that federal regulations might disrupt their community. In response they worked to address the water quality issues that affected the sculpin and their own



*The grotto sculpin (*Cottus specus*) lives nowhere on Earth except cave streams in Perry County. MISSOURI DEPARTMENT OF CONSERVATION*

drinking water without cumbersome regulations. It was an approach that US Fish and Wildlife Service officials recognized as one-of-a-kind and they approved. An initial potential conflict turned into good news when the community engaged it creatively, as residents and organizations worked together to reduce sediment and agricultural chemicals entering groundwater and caves, improving the habitat and the landscape for all.



NEIL ROSENBAUM



Above: The documentary crew shoots video of a cave salamander (inset, left) in a cave directly beneath the city of Perryville. KEN GRUSH

This documentary has been featured at the National Cave and Karst Management Symposium, October 2019; Missouri Natural Resources Conference, February 2020; and the online national Natural Areas Conference, October 2020. Video producer Denise Henderson Vaughn is assisting the ongoing distribution plans, with an emphasis on offering the video to people in Perry County.

Below: Veteran caver Richard Young is featured in "Karst in Perry County," telling how conditions have improved in this cave since his first visit more than 20 years ago. TONY SCHMITT



Caver Tony Schmitt descends via rope into a deep pit in one of the scenes in "Karst in Perry County."
DENISE HENDERSON VAUGHN



NEW INTERPRETIVE PANELS FOR GRAND GULF

This past year Missouri State Park staff at the park and in Jefferson City developed a set of eight interpretive panels for Grand Gulf State Park in Oregon County. These have replaced and updated existing information, as well as added new interpretation along the most recently developed loop trail, which is reached by crossing the natural bridge. Missouri State Park officials, L-A-D Foundation directors John Karel and Janet Fraley, and park visitors gathered at the park on Saturday, October 17 to dedicate the panels.

The brightly colored, informative panels are a wonderful installation for park visitors. One of the panels includes photos and narrative highlighting the most important players in the history of the park: Luella Agnes Owen, who explored the underground passages from 1892-1897; Leo Drey, who purchased the land to protect it in 1970; and Dorothy Woolford Ellis, who spent her youth exploring Grand Gulf and was a lifelong tenacious advocate for the park and other outstanding natural resources of Oregon County in her 14-year tenure as an elected county commissioner and after.

The L-A-D Foundation owns 159 acres at Grand Gulf State Park and donates its lease to the Missouri Department of Natural Resources as part of Missouri's State Park System. In 1971 the National Park Service recognized the site as a National Natural Landmark. It became a state park in 1984, and it was recognized as a Missouri Natural Area in 1986. The park is located seven miles west of Thayer.



Ribbon cutting for the new Grand Gulf interpretive panels took place October 17. From left: Municipal Judge Bill Hass, Greg Langley, Missouri States Parks (MSP) Regional Director Laura Hendrickson, MSP Deputy Director Brian Stith, L-A-D Foundation board members John Karel and Janet Fraley, MSP Site Specialist Matthew Kantola, MSP Supervisor Doug Rusk, Oregon County native Julius Fraley and Oregon County residents Janet Underwood and Darlene Combs. KIMBERLY LANGSTON, WEST PLAINS DAILY QUILL

VISITS TO L-A-D FOUNDATION LANDS

March 4, 2020. Researchers from the Jones Center at Ichauway in Newton, Georgia, the University of Missouri-Columbia, and the US Forest Service Northern Research Station visited Pioneer Forest for a day tour and evening dinner and discussion. Staff, researchers, L-A-D advisor David Larsen, and board members Susan Flader and Janet Fraley compared experience in managing southern yellow pine species in Georgia and Missouri and discussed the problem of pine markets in Missouri and opportunities for collaborative research among the various organizations.

June 15-24, 2020. Sierra Club and individual volunteers joined in trail maintenance in the Roger Pryor Pioneer Backcountry.

August 19, 2020. MDC Natural Areas Coordinator Mike Leahy joined with L-A-D Land Stewardship Coordinator Neal Humke to sample the Pine-Oak Woodland Ecological Management Area using the Community Health Index system, a rapid inventory method being developed to assess natural community quality and richness.

September 12, 2020. Missouri Prairie Foundation members toured Pioneer Forest's Pine-Oak Woodland Ecological Management Area. (See photos next two pages.)

September 28 - October 8, 2020. AmeriCorps St. Louis held their yearly team member training at Current River State Park, a change from typically holding it in Montana. AmeriCorps utilized our Pine-Oak Woodland Ecological Management Area for chainsaw training on trees needing to be cut.

October 9, 2020. Forest ReLeaf of Missouri toured the Virgin Pine and the Pine-Oak Woodland Ecological Management Area. Staff and ReLeaf members discussed Pioneer Forest history, ownership, forest management, and ecological management.

November 23, 2020. Jason Green responded to a request from Salem Rotary with a presentation on the history, management, and current activities of Pioneer Forest.

MISSOURI PRAIRIE FOUNDATION VISITS THE VIRGIN PINE AND PINE-OAK WOODLAND



Members of the Missouri Prairie Foundation explored Pioneer Forest's Virgin Pine and Pine-Oak Woodland Ecological Management Area during a tour September 12. Above, Neal Humke, far right, and participants discussed pine woodland management goals, challenges, and successes.

*This woodland supports diverse groundcover and wildflowers, many of which are highly affiliated with intact natural systems. Several plant species here are of conservation priority, which is measured with the "coefficient of conservatism" or CC value (1=lowest, 10=highest). Plants include, from top left, false foxglove (*Aureolaria flava*, CC=8); wild oregano (*Cunila origanoides*, CC=6); slender ladies' tresses (*Spiranthes lacera*, CC=6); and blazing star (*Liatris squarrulosa*, CC=8). PHOTOS BY JENNIFER POTRATZ*



Above: Missouri Prairie Foundation Executive Director Carol Davit and Neal Humke organized the September 12 field trip. During his presentation, Humke described shortleaf pine forest management, regeneration, and fire adaptations.

*Below: Participants familiar with prairie species of blazing star were excited to see the woodland species (*Liatris squarrulosa*). This blazing star has a high conservation value and is an indicator species for restored pine woodlands, which can be considered a grassland community.*



Right: Colleen Potratz holds a shortleaf pine seedling displaying the angled growth pattern, a fire-adapted characteristic. Unlike other pine species, if the top is burned, this j-shaped crook can send up new buds and the tree regrows.

PHOTOS BY JENNIFER POTRATZ



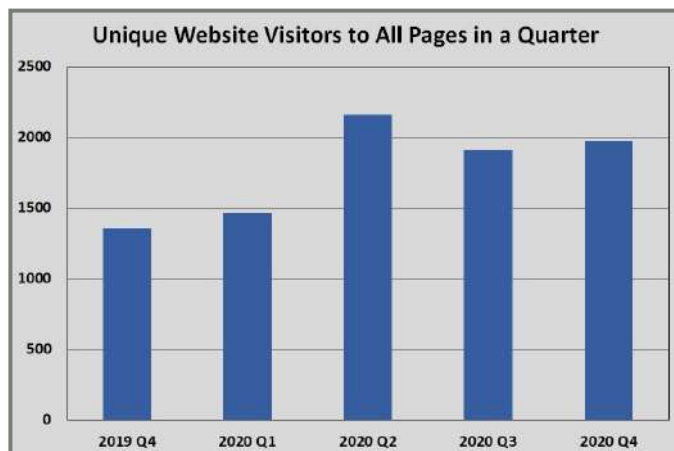
Above: Mike Leahy gave an introduction and served as a tour leader. He is technical advisor for the Missouri Prairie Foundation and natural areas coordinator for the Missouri Department of Conservation.



L-A-D FOUNDATION WEBSITE REACHES MANY MORE IN 2020

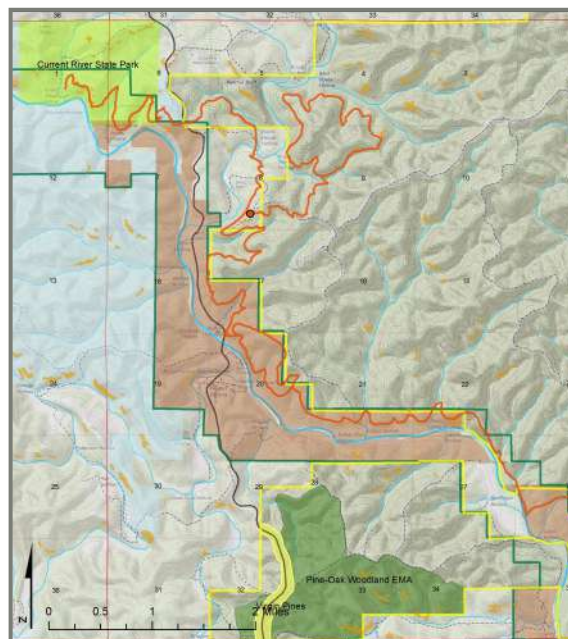
The L-A-D Foundation website, ladfoundation.org, has grown in traffic since we started using Google Analytics in September 2019 to track the number of discrete users. As a second year of data emerges, we will be noting whether an apparently seasonal trend continues.

We are pleased that a new page, Recreation on Pioneer Forest, has ranked sixth in traffic among 51 pages consistently since its second month. The fact that this page cannot be reached from the home page navigation without using the pull-down menu makes this datum even more impressive.



This chart depicts the total number of website visitors to all pages of our website in each quarter since data collection began. While daily and monthly variations are to be expected, the overall trend is upward. We believe that added interest in outdoor recreation during the second quarter led to a spike in traffic.

DATA FROM GOOGLE ANALYTICS.



Above: People seeking recreation opportunities on Pioneer Forest can access hiking maps such as this one found on the Roger Pryor Pioneer Backcountry website page. It shows a portion of the new Current River Trail, one of five trail maps, which are overlaid on a topographic base layer.

Below: Home page of L-A-D website as of January 2021.



2020 Annual Report of the L-A-D Foundation

L-A-D DOCUMENTING THE LOST TOWN OF BRUSHY

Mapping Pioneer Forest's historical and cultural resources has been underway this year. These data include information from oral histories, old topographic maps, and on-the-ground searches for historical structures or remnants. Working with retired USGS mapper Keith Powell, who volunteers with the Shannon County Historical Society, we are documenting the locations of dwellings, schools, post offices, stores, and cemeteries in long-gone communities along Blair and Brushy creeks. This includes mapping vestiges from the turn-of-the-century timber boom, such as sawmills and narrow-gauge tram lines found on Pioneer land.

In the heart of the Roger Pryor Pioneer Backcountry, there was once the small company town of Brushy. Served by a railroad and featuring a big stave mill, it operated roughly from the Depression era to World War II. But when the virgin white oak played out, the mill was hauled away, the railroad tracks pulled up, and the entire town site was sold in 1950.

While Brushy and its buildings are clearly marked on the USGS 1945 topo map, it was literally erased from subsequent maps. The physical remains of this enclave, too, are almost obliterated. The woods now hide all but a few concrete remnants. Back-country hikers on the Brushy Creek Trail might never guess that rail tracks once lay where they walk.

Now, seventy years after this community expired, and before its vestiges are completely lost, the L-A-D Foundation is rediscovering and documenting its location and layout by combining today's GPS technology and ArcGIS mapping with the long memories of retired staff and local families who hold Brushy's stories from yesteryear. In November, retired forest manager Terry Cunningham, an avid history buff and advisory council member who advocates for stewardship of our cultural heritage, organized a historical survey of the abandoned town with GIS specialists Curtis and Crystal Copeland, accompanied by Jason Green, Brandon Kuhn, and Greg Iffrig of our staff.

Brushy Mill and the mill town were built by Pioneer Cooperage Company in the bottom of Brushy Creek hollow between 1928 and 1929. Former forest manager Ed Woods reported in the 1947 cutting records that "Brushy set in one location for about 20 years and at one time was considered the largest stave mill in the world. A mill camp (company owned) of over 30 houses with a store, school, church, and railroad station were also located there." There was also an equipment building and "grease pit" used for maintaining equipment.

Lumber companies in the timbered region of southeast Missouri relied on rail lines to transport logs. By 1910 one of these, the Missouri Southern, had upgraded its 25lb rail to the new 40lb rail and had lengthened its line into a 54-mile long route connecting Leeper and



Above: Aerial view of the Brushy valley during the time when the mill was operating.

Left: Barrel staves stacked up near the Brushy Mill.

PHOTOS FROM L-A-D FOUNDATION ARCHIVES

Bunker. Ellington Mercantile was beside the tracks as Missouri Southern ran up the middle of the main street and at Corridon the depot also served as a general store (Classic Trains forum, Missouri Southern, 09FEB2006). The Railway and Locomotive Historical Society (Bulletin No. 123, 1970; pages 45-51) reported the Interstate Commerce Commission authorized the Missouri Southern to build an 18-mile long extension from Hobart at Mile 49.8 and ending at Brushy at mile 65.2; it opened in the fall of 1929 and hauled people, supplies, and barrel staves to and from the community. The mill was steam powered with water from adjacent Brushy Creek. Terry Cunningham learned from conversations with Pioneer's first forest managers Ed Woods and Charlie Kirk that the mill's steam engine was hauled in on a chain-driven Mack truck, not the rail line as many would assume.

Much of the Pioneer Cooperage land reached by the new narrow-gauge line still had virgin timber. By 1940, most of that was cut, which reduced the loads of goods hauled by rail. The company was losing money due to the significant reduction in rail traffic. The rails were abandoned and dismantled by May 1941. Pioneer Cooperage sold out to National Distillers Products Corporation of New York in 1946.



Above: Steps leading up to the old store. GREG IFFRIG

Below: Grease pit/maintenance building. TERRY CUNNINGHAM



Our cutting records indicate that in 1950 National Distillers sold the remaining buildings at auction, and in 1954 the remnants of Brushy were in the heart of nearly 90,000 acres purchased by Leo Drey for what he would henceforth call Pioneer Forest.

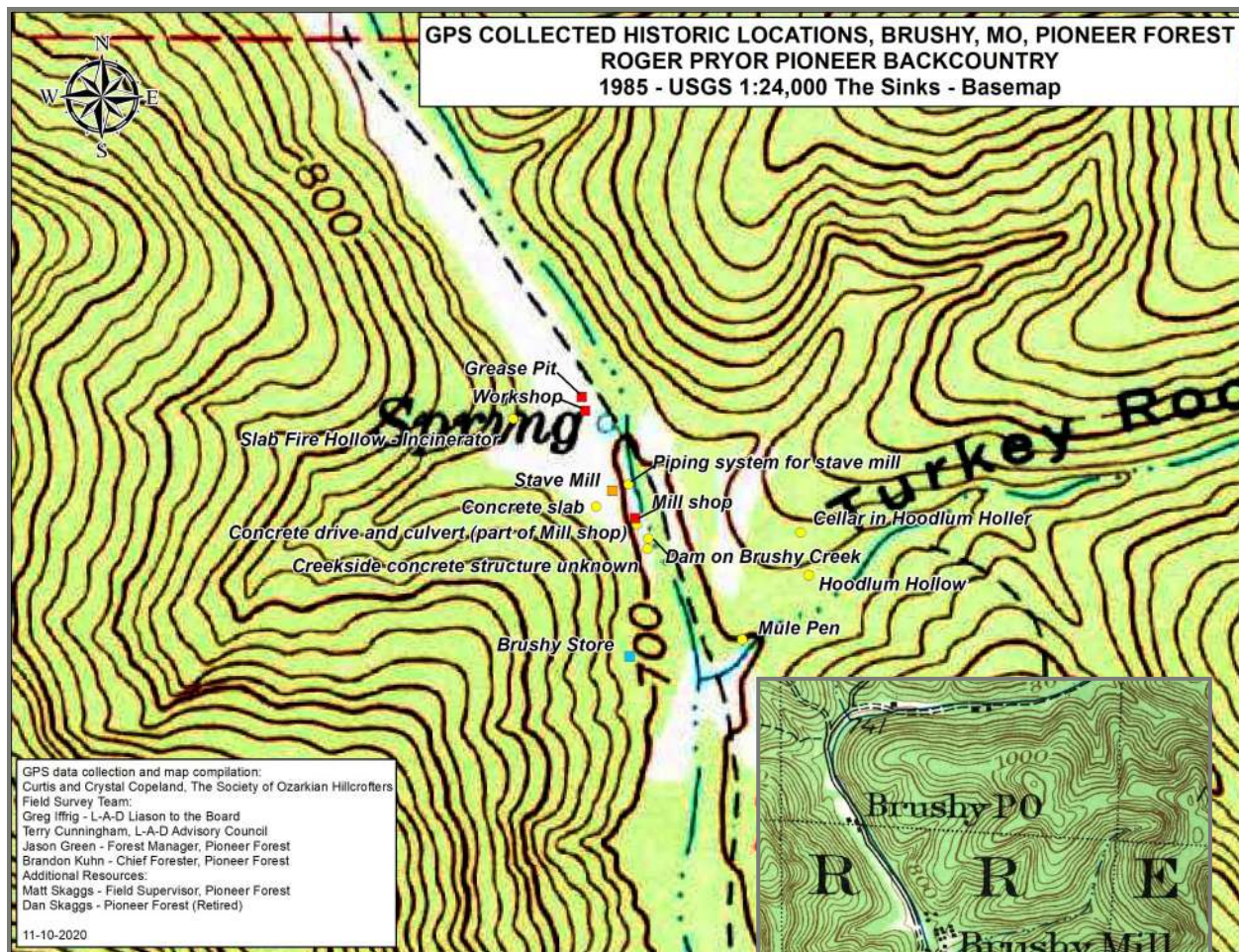
During the field trip in November, the first structure located was the grease pit/maintenance building. Records of this location and others were geo-located by GPS device. Across Slab Fire Hollow, a small hollow where wood waste was burned, was the main mill, which was identified by twelve concrete piers. Also found was mill piping along with remnants of a mill pond dam, which provided water for the steam engine. Just below the main mill is a large concrete slab and bridge accessing it from the south. The last building on the west side was the company store (the 1945 USGS topo map indicates it was a school). The maintenance shed and grease pit were all located on the west side of the creek. The likely location of housing for workers and their families was on the east side of the creek, though no remains were found. A mule pen and the site of a large barn were identified here. The nearby hollow is named Turkey Roost Hollow on the topo map but locals called it



the Hoodlum Prong of Brushy. The rail station, post office, and church have not yet been identified.

Today, the Brushy Creek Trail from the Himont Trailhead to the Current River leads down into the hollow along the bed of the abandoned railroad line passing through the old town, where the remnants are hardly visible.

Left: Brushy Creek Trail on the bed of the old railroad line. GREG IFFRIG



The USGS Round Spring topo map from 1945 (inset at right) shows the Brushy community, with a cluster of buildings including post office, mill, and housing for mill workers. The detail from that older map is gone from the current USGS topo, so we are field-verifying and re-entering that historical information. The new map we have created is above. MAP BY CURTIS COPELAND

SOCIETY OF OZARKIAN HILLCROFTERS

Curtis Copeland and his wife Crystal, of Branson, are both GIS specialists and volunteers for the Society of Ozarkian Hillcrofters. They each have a strong interest in historical surveys and recording geospatial locations of historically important areas. In recent years they have been reviving the Hillcrofters society, which formed in 1931; among its original members were Otto Ernest Rayburn and Vance Randolph. The Copelands recently assisted Pioneer in exploring the history of its lands at the long-abandoned town of Brushy, Mo., and preserving that information.



Exploring and mapping GPS locations in the vanished town of Brushy are, left to right, Brandon Kuhn and Jason Green of Pioneer Forest, former forest manager Terry Cunningham, and Curtis and Crystal Copeland. CURTIS COPELAND

L-A-D FOUNDATION

PIONEER FOREST MANAGEMENT
LAND CONSOLIDATION
RESEARCH AND MONITORING
STEWARDSHIP AND RECREATION
OUTREACH AND EDUCATION
GRANTMAKING AND COMMUNITY SUPPORT
PUBLIC POLICY
ADMINISTRATION

Grantmaking and Community Support



Mount Zion Church, a classic Ozark stone church, received L-A-D grant support. GREG IFFRIG

The foundation provides small grants (up to \$5,000) to organizations working in or serving the Missouri Ozarks. We are particularly interested in projects that emphasize the protection of natural and cultural resources of the region. We also look for projects that need funding to get started or an assist to reach completion. More information on these grants can be found on the foundation's website at ladfoundation.org/grant-making/.

This year we completed a review of our process and simplified the application form we use. We have minimized the paperwork the foundation will require for 2021, and we hope grant applicants will find it easier to understand and apply. In addition to our small grants, Pioneer Forest also funds scholarships for graduating high school seniors and contributes funding to local and state projects in the area we serve; for information on either opportunity please call the Pioneer office in Salem.

2020 L-A-D FOUNDATION GRANT RECIPIENTS

At the October meeting of the L-A-D Foundation Board of Directors, the following grant awards were approved.

- **AmeriCorps St. Louis.** “Invasive Species Removal—Native Tree Health and Growth.” New chainsaws and handsaws to be used in invasive species work in Missouri and two camp stoves to allow teams to conduct week-long projects in wilderness areas.
- **Mark Twain Forest Watchers**, a project of the Ozarks Resource Center. “Public Forest Management Monitoring Project.” Citizen monitoring of the management of the Mark Twain National Forest, with a priority focus on sensitive area protection.
- **Missouri Caves and Karst Conservancy.** “Goodwin Sinkhole Project.” Install a fence to prevent future illegal dumping of trash into Goodwin Cave.
- **Missouri Parks Association.** “Urban Populations Outreach Program (UPOP).” Support a program that provides hands-on nature experiences for Dent County youth.



AmeriCorps St. Louis team members used fire-fighting equipment purchased through a 2019 grant from L-A-D.
AMERICORPS ST. LOUIS

- **Missouri Prairie Foundation.** “Stark Family Prairie Woodland Restoration Training.” Free public woodland restoration training day in Hickory County, explaining how invasive trees and shrubs impact native herbaceous plants and encouraging more people to actively manage their lands to promote native species growth.
- **Missouri Sierra Club.** “Ozark Rivers.” Support the Ozark National Scenic Riverways Roads and Trails Plan project and protect Eleven Point State Park.
- **Ozark Riverways Foundation** on behalf of the “Mt. Zion Church Education and Restoration Project.” Volunteer efforts to repair and preserve the church built in the late 1930s and now owned by the National Park Service.
- **Open Space Council.** “Root Docking Workshop.” Host a training workshop on root docking, a removal method for invasive bush honeysuckle that prevents re-sprout.
- **Ozark Rivers Audubon Chapter.** “Oak-Hickory Forest Restoration.” Cedar removal in an oak-hickory landscape at the Audubon Trails Nature Center in Rolla.
- **Ozark Trail Association.** “2021 Trail Skills College.” Support the Trail Skills College, a weekend training event for 50-75 trail volunteers.



In 2020, L-A-D Foundation provided funding to help restore Mount Zion Church near Akers Ferry, which is now owned by the National Park Service. GREG IFFRIG

2020 PIONEER FOREST LOCAL COMMUNITY SUPPORT

Shannon County Museum Business Membership. Pioneer Forest purchased a yearly membership that supports the Shannon County Museum.

Missouri Stream Team 1028. Pioneer Forest supported the Upper Current River cleanup, which removes trash along the river.

Salem High School Project Prom. Supporting this project provides high school prom students safe and drug free activities after prom.

Bunker High School Jazz Band. Pioneer Forest donated money to help with travel expenses for a Bunker High School Jazz Band trip to Washington, D.C.

Forest and Woodland Association. Pioneer Forest helped support the Forestry Summit meeting, which was hosted by the Forest and Woodland Association of Missouri.

Bunker Timber Museum. Pioneer Forest supported this museum, which collects the rich history of the Bunker timber industry.

Reynolds County Historical Society. This organization collects and documents the history of Reynolds County, Missouri.

Ozark Natural and Cultural Resource Center. The Ozark Natural and Cultural Resource Center was created to provide information about natural and cultural opportunities for learning and recreational experience, while promoting responsible resource stewardship.

PIONEER FOREST SCHOLARSHIP RECIPIENTS 2020

Pioneer Forest staff members review applications from seniors graduating from area high schools who plan to attend college or trade school. One scholarship is awarded for each of five communities served.

Bunker High School — Alexis Gordon will attend Ozark Technical Community College in Springfield. She plans to transfer to Missouri State University to become a nurse anesthetist.

Ellington High School — Maicey Conway will attend Missouri State University in Springfield. She will pursue a degree in social work. She has a passion for working with young underprivileged children.

Eminence High School — Lexey Cooley plans to attend Missouri State University in Springfield to study business. She plans to find a career that allows her to work outdoors.

Summersville High School — Patrick Hawkins plans to attend College of the Ozarks and receive a biology degree. He would like to work in the field of wildlife conservation.

Van Buren High School — Hailie Hampton will attend Three Rivers College and major in biological sciences. She plans to obtain a job with the Missouri Department of Conservation.

FENCE REPLACED AT OLD DILLARD CEMETERY

The L-A-D Foundation provided \$2,500 this year to Old Dillard Cemetery, surrounded by Dillard Mill State Historic Site, for the purchase of materials (cedar split rail fencing, cement, cedar split rail gates, and hardware). Volunteers from the cemetery association provided the labor. The new installation is a much better match to materials used in similar restorative work at the historic site. An estimated 150 known graves are in the cemetery. The oldest burial is Eliza Wisdom who died in 1853.

In 1974 Leo Drey negotiated the purchase of the 130-acre Dillard Mill property and donated that to the L-A-D Foundation. The next year it became a state historic site through a lease donated by the L-A-D Foundation. Through that agreement the mill has been part of the Missouri State Park System for the past 45 years.



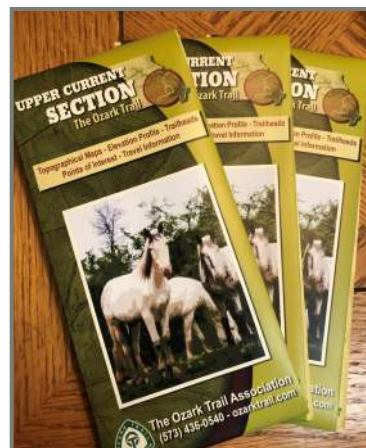
Above: Replacement wood fence at Old Dillard Cemetery. Right: Old cemetery fence in poor condition. GREG IFFRIG

SUPPORT FOR OZARK TRAIL ASSOCIATION'S NEW MAP

Early this year we provided funding to the Ozark Trail Association for printing their newest publication, a map of the Upper Current Section of the Ozark Trail.

Included is the routing from the Blair Creek Section of the Ozark Trail west on the Laxton Hollow Trail to Himont Trailhead, then further west along the Brushy Creek Trail to the mouth of Brushy Creek, from there following upriver on the Current River Trail past Round Spring, through Echo Bluff State Park, and ending at Current River State Park.

This brochure is printed on waterproof paper using an enlarged color topographic map. Individual copies of the map are \$12.95 and available through the Ozark Trail Association from their online store at website <https://ozarktrail.com/product/upper-current-section-map/>.



The new Upper Current Section of the Ozark Trail map.



Left: Ozark children learning about natural critters. MISSOURI PARKS ASSOCIATION



2019 GRANT PROJECTS



*Fire crews learning from Land Stewardship Coordinator Neal Humke.
AMERICORPS ST. LOUIS*



Henry Robertson and Kathleen Henry from the Great Rivers Environmental Law Center arguing the case against bush honeysuckle at mock trial funded by an L-A-D grant to the Missouri Environmental Education Association. HOPE GRIBBLE

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Public Policy



*Meeting at the Dennig Cabins in
2013 hosted by USFS staff.*

GREG IFFRIG

The L-A-D Foundation actively monitors planning efforts and proposed public policy that involve or impact our lands or neighboring properties. Pioneer Forest lands join miles of the Ozark National Scenic Riverways, various districts of the Mark Twain National Forest, Missouri Department of Conservation land, and several state parks. We donate leases for two state parks to MoDNR and for seven Missouri Natural Areas to MDC.

This year we collaborated with the Mark Twain to resubmit a nomination of the Dennig Cabins Historic District to the National Register of Historic Places. For several years the NPS has been engaged in updating the Riverways' roads and trails management plan, and we continue to be involved. With ongoing damage from feral hogs on our lands, we actively participate in statewide eradication efforts. Two other issues we have paid particular attention to have been the Missouri Comprehensive Conservation Strategy and resource damage from overuse on some of our lands. At the MDC Partners Roundtable in October, L-A-D President Flader was one of the speakers in the opening plenary session.

DETERMINING ELIGIBILITY OF THE DENNIG CABINS AT GREER SPRING TO BE INCLUDED ON THE NATIONAL REGISTER OF HISTORIC PLACES

We began working with the Mark Twain National Forest in 2018 to research eligibility of the Dennig Cabins Historic District for listing on the National Register. The L-A-D Foundation hired a consultant, Bonnie Stepenoff, retired professor emerita of history at Southeast Missouri State University, to prepare a nomination to the National Register. She has conducted extensive research for other National Register nominations in Missouri.

Barbara Wyatt, historian with the National Register of Historic Places, returned the original nomination for reconsideration of boundaries and the period of conservation significance. That nomination was significantly reworked with the additional help of David Cain, zone archaeologist at Mark Twain National Forest, who then sent the revision to the MoDNR State Historic Preservation Office this summer for a second review and signature. It now has been forwarded to the US Forest Service regional Federal Preservation Office. With that final recommendation the nomination will then be returned to the keeper's office at the National Park Service for approval.



Dennig Cabins on Greer Spring Branch of the Eleven Point River.

GREG IFFRIG

The L-A-D Foundation has had an interest in the Eleven Point National Scenic River since it was established in 1968, and especially since 1988 when our founder Leo Drey acquired nearly 8000 acres from the Dennig family; later he transferred the property to the Mark Twain National Forest, with part of the land added to the national scenic river and the remainder included as a special unit of the national forest.

In 2012, Leo and Kay Drey assigned to the L-A-D Foundation their rights to restrict the existing private road known as the “Dennig Road” from Highway 19 to the cabins for limited administrative use. The road has been managed through a memorandum of understanding between L-A-D and the Mark Twain since 2014.

OZARK NATIONAL SCENIC RIVERWAYS, ROADS AND TRAILS

After adoption of the park's 2015 General Management Plan, NPS staff at the Riverways have focused on management plans for more specific issues, especially a new Roads and Trails Plan to address the proliferation of unauthorized roads, access points, and river crossings since ONSR's 1991 Roads and Trails Plan. In 1964 when the national park was established as the first federally protected river in the nation, there were few access points where public motorized traffic could reach the river. The park was established to save the Current River as a scenic free-flowing stream with public motorized access only about every seven miles, an easy day's float trip. Since then, roads and motorized uses within the park have increased alarmingly along with resource damages.

The L-A-D Foundation owns considerable land along the Riverways, including nearly 1,000 acres within the congressionally authorized boundary of ONSR under donated scenic easement to the National Park Service. This past year we have been discussing with new ONSR Superintendent Jason Lott and his staff several of the many roads, river crossings, and access to easement lands that lead to and through our land.



The Upper Current is narrow and often congested. Below Akers at Lewis Hollow, L-A-D land under scenic easement has been trespassed and damaged. Motorized vehicles have been crossing the river at two locations just one-half mile apart. Upstream from Akers at Flying W near Welch Spring, the L-A-D Foundation owns land across the Current River at Bluff School. The crossing here puts river users, equestrians, and other park users in competition with motorized vehicles. Resolving these issues will require agreement among Shannon County officials, NPS, and L-A-D, we hope amicably.

Upper Current River at Dooley Hollow in Shannon County. GREG IFFRIG

FERAL SWINE REMOVAL

During 2020 the removal of feral swine continued to be a priority for Pioneer Forest staff. Chief Forester Brandon Kuhn served as the primary Pioneer Forest representative on the newly instituted Incident Command System (ICS) project, which allowed for additional cooperation between the US Forest Service, the Missouri Department of Conservation (MDC), USDA Wildlife Services, and numerous other stakeholders in the fight against feral hogs. One goal for the ICS was to help manage public response to the permanent closure of Mark Twain National Forest to hog hunting in December 2019. The closure was supported by the L-A-D Foundation and Pioneer Forest, which had previously issued a ban on feral swine hunting in October 2016. On April 3, 2020, the National Park Service announced a temporary closure of Ozark National Scenic Riverways lands to feral swine hunting. For those unfamiliar with the situation, hunting bans have been adopted to discourage an entrenched hog hunting culture that values feral swine for recreational hunting despite the damages and ecological losses caused by the species. The bans were put in place to disincentivize releasing feral swine for the development of huntable populations and to reduce the instances of hunters interfering with trapping efforts.

Trapping continues to be the primary means of removing feral swine from Pioneer Forest. In January, to facilitate well implemented trapping, Pioneer hired a part-time feral swine removal specialist, JR Lanham. This adaptive step included the construction of additional drop traps and the purchase of additional game cameras. Lanham has been a master at scouting for hogs, setting up traps, and removing entire sounders of hogs from the forest. His presence also helps staff to balance their workload toward timber management, though all the staff help with our feral hog efforts.

During MDC's winter operations from early January until the end of March, MDC staff scouted 669,000 acres across southern Missouri, and the state-wide collaborative effort removed 3,400 feral swine. During summer operations from June 3 to August 31, Pioneer Forest received welcome aid in the form of additional manpower and supplies. MDC staff from both the Ellington and Eminence offices worked in concert with Pioneer staff to trap swine on impacted Pioneer Forest lands, while balancing their efforts with obligations to other private land owners, assisting the US Forest Service, and trapping feral pigs on MDC-owned lands. Efforts by MDC and USDA staff on Pioneer Forest resulted in the capture and dispatch of 87 pigs in Shannon County, 149 in Reynolds County, and 3 in Carter County.

Data regarding feral swine distribution in Missouri compiled by MDC, USDA Wildlife Services, and other stakeholders offers a welcome indication of progress. In 2016 feral swine were known to occupy 383 Missouri watersheds. In 2020, after four years of increasing effort by those involved in the formal feral swine elimination strategy, feral swine occupied only 210 of the state's watersheds.

Pioneer, MDC, and USDA together removed 703 pigs from Pioneer Forest in 2020. This far surpasses the 2019 catch of 250. Our lands benefitted this past year from much good work from employee JR Lanham, who removed 374 pigs. The increase in total removals also reflects much appreciated help from MDC and USDA staff through the new Incident Command System. Pioneer Forest and the L-A-D Foundation are invested in the continuing and evolving effort of reducing both the state's feral swine population and the associated ecological damages.



During 2020 Pioneer Forest's feral hog elimination totals greatly increased. JR LANHAM

MISSOURI COMPREHENSIVE CONSERVATION STRATEGY

In response to an invitation, the L-A-D Foundation has reviewed an early draft of a statewide Comprehensive Conservation Strategy. This is a new document required for the Missouri Department of Conservation (MDC) to receive federal funding, and it combines previous statewide plans for forestry and wildlife. This overall planning effort was scheduled for completion by MDC by the end of 2020. We made suggestions regarding the foundation's restoration work, such as our Pine-Oak Woodland in the Current River Hills and our collaborative work with MDC at Blue Spring Branch Conservation Area in the Perry County karst region.

The draft document noted the tremendous decline of shortleaf pine at the turn of the 20th century. We pointed out that significant efforts have been made to restore the species, especially on the Mark Twain National Forest, and we encouraged further research and promotion of higher-value markets for shortleaf pine. Having a market is the best assurance that shortleaf pine will be sustained in Missouri forests and woodlands.

PRESIDENT FLADER ADDRESSES CONSERVATION ROUNDTABLE

President Susan Flader spoke about the past, present, and future of conservation during the opening plenary panel at the 2020 Conservation Partners Roundtable held October 13-14 and hosted by the Missouri Department of Conservation. MDC Director Sara Parker Pauley introduced the panel, which also included Simon Roosevelt, the great, great grandson of Theodore Roosevelt, and Colin O'Mara, President and CEO of the National Wildlife Federation.

Susan traced Missouri's conservation history beginning in the Progressive Era at the dawn of the 20th century, influenced at the national level by Theodore Roosevelt and his chief forester Gifford Pinchot. The history also includes early efforts of two Missouri governors, St. Louis Democrat Joseph Folk, who secured enactment of a model game and fish protection law only to see it soon eviscerated, and Kansas City Republican Herbert Hadley, who sought unsuccessfully to establish forestry and waterways commissions and a state park system. The result was that Missouri would be a relative latecomer to state-level conservation efforts. The state's big cities fared somewhat better, led by local citizens, especially women, advocating cleaner and more healthy water, air, food, streets, and parks.

Flader's point was that in a state largely dominated by conservative rural legislators of whatever party,



L-A-D Foundation President Susan Flader during a 2018 conference.

DENISE HENDERSON VAUGHN

conservation progress would require citizen action. Among her list of the most important players in Missouri conservation history were: Aldo Leopold, who visited Missouri often from the late 1920s to '40s and emphasized engaging farmers and other citizens to build conservation on the land; E. Sydney Stephens, who led the broad-based citizen effort in 1936 for an initiative petition to establish what would become the state's pace-setting bipartisan conservation commission; and Leo Drey, who demonstrated a more natural form of uneven-aged management on his Pioneer Forest that citizens could point to in advocating for less reliance on the clear-cutting that had become the norm on most federal and state forests during the 1960s to '90s.

Even—and especially—during the darkest times, she concluded, Missouri citizens continue their efforts at the local level to restore healthy lands and communities, pointing the way to a better conservation future.

PUBLIC USE TRAILS AT HICKORY CANYONS NATURAL AREA

Natural resources have been damaged and signs vandalized at the L-A-D Foundation's 1,134-acre Hickory Canyons Natural Area in Ste. Genevieve County. The site, managed through a donated lease to the Missouri Department of Conservation (MDC), has been carrying more use than was anticipated when its trails were initially constructed, and that use has accelerated. The damage was reported to staff and the board by director John Karel, who lives in Ste. Genevieve County. In March, MDC staff fixed broken signs and erased spray-paint vandalism. That damage and the Covid-induced search for open-air recreation this year led to a multi-agency meeting of managers in August to discuss public use areas in the sensitive Lamotte sandstone region, which include Hickory Canyons, MDC's Pickle Spring, and MoDNR's Hawn State Park.

In September, L-A-D board member Janet Fraley visited Hickory Canyons and reported ongoing problems and degradation, which was discussed during the board's fall meeting October 5. Staff then developed a guidance document and began working more closely with MDC staff to resolve the overuse issues.

With board and MDC agreement, L-A-D engaged professional contractor Deb Schnack to study the site and develop guidelines for a more sustainable trails system for the future. Deb is a retired director of planning for Missouri State Parks, is widely known and respected, and has led the redesign of trails at



Full parking lot at Hickory Canyons Natural Area, May 7, 2020. GREG IFFRIG

state parks including Rock Bridge Memorial, Johnson's Shut Ins, and Grand Gulf. She indicated great interest in the problem, offered to contribute her services gratis, and has already conducted a visit to the site.

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Administration



*L-A-D Treasurer Wayne Goode
with Clare Holdinghaus-Ireland
at a celebration for Clare.*

JENNIFER POTRATZ

2020 was a unique year with many known and other unforeseen challenges. Completing successful transitions and implementing our strategic plan were prominent this year and will continue into the next. With the Covid pandemic we have been adapting within the organization and in how we work with others, but we have not slowed our pace.

In January, the board adopted the written framework for our strategic plan based on our August 2019 planning retreat and subsequent small group work, and we began transitioning to the implementation phase. You are seeing reference to the plan throughout this year's annual report and particularly in the two sections about implementation that follow.

Throughout the winter and spring of 2020, the board and the St. Louis staff conducted a search for a new business manager. As she was leaving, Clare Holdinghaus-Ireland spent several months assisting with the recruiting and selection process for her successor, Jennifer Potratz, and Clare and Jennifer spent a month working together as Clare wrapped up five years with the L-A-D Foundation before moving with her husband Peter to Vermont.

During this transition, Clare began to consolidate financial reporting for both L-A-D and Pioneer Forest in a single set of QuickBooks files, instead of two separate sets of reports that we maintained ever since Leo and Kay Drey's 2004 donation of the forest to the foundation. As of December, we are still working with Wilhelm and Wilhelm, our accountants, to move all L-A-D and Pioneer investments and other assets into one set of books, with the two entities carefully identified in the names of the various accounts. In the years ahead, this will make it much easier for staff and board to see and understand the total financial picture.

Days before the board's October meeting we learned of the death of Wayne Goode, L-A-D's long-time treasurer and board member, who had been intimately involved in setting up and monitoring our financial management systems. We are all deeply saddened by the loss of a colleague and a friend.

Fortunately, Wayne and others on the board's executive and finance committees had seen the need for more widespread and deeper understanding of the evolution of the organization's complex financial systems and accounts and arranged for Clare to conduct two financial trainings for the entire board and key staff, including our new business manager. To help in the dual transition of business managers and financial reporting, in June we elected an assistant treasurer, Ted Heisel, to fill a position that had been in our L-A-D bylaws from the start. At our board meeting two days after Wayne's death, Ted Heisel was elected treasurer.

At our October meeting, we welcomed two new members to the board, Mike Smith of Washington, and Adam Saunders of Columbia. We have been anticipating the retirement of long-time Liaison to the Board Greg Iffrig. In November he announced his upcoming retirement in the spring of 2021, so we are preparing to conduct a national search for a new position, L-A-D Foundation Manager. The search will be launched in early January, and we hope to fill it by late March.

STRATEGIC PLAN IMPLEMENTATION UNDERWAY

L-A-D directors, staff, and advisors met for three days at our Pioneer Forest headquarters in Salem in August 2019 to consider our organization's strengths and weaknesses, challenges and opportunities across the entire range of our programs and come to a general understanding of the strategic goals and initiatives we were going to pursue in the next five years, as reviewed in our 2019 annual report.

Work then continued in small groups through the fall and early winter to develop action items for each goal and initiative and to consider sequence and timing, staffing needs, costs, and implications for our organizational structure. This was combined into a more detailed framework that, while not fully worked out, won approval at our January board meeting as a dynamic, continually evolving plan.

What follows is a brief summary of major goals and initiatives and the status of implementation for certain actions:

Goal 1: Maintain a diverse and resilient forest through uneven-aged management and adaptive response to problems. The sawtimber volume on Pioneer Forest has been increasing in recent decades along with some decrease in regeneration. The following initiatives and actions are underway:

- A field supervisor and two new foresters were added to the forest in 2019 in order to enhance capacity for raising harvest levels from fewer than 5,000 to about 7,000 acres per year and maintaining a 20-year reentry period.
- Staff have adjusted the harvest prescriptions forest-wide to cut an extra one-to-two trees per acre to encourage regeneration, and are monitoring the results.
- L-A-D is now funding a graduate research project at the University of Missouri-Columbia (UMC) to study the sustainability of harvest levels on Pioneer Forest.
- With 30% of Pioneer Forest's standing volume in shortleaf pine for which there is no higher-value market in Missouri, the foundation has begun engaging with partners such as MDC, Mark Twain National Forest, and the UMC School of Natural Resources about the need to help encourage development of a pine market in Missouri.
- Pioneer and stewardship staff are developing a management plan and scenarios for using prescribed fire to encourage reproduction of shortleaf pine growing in conjunction with white oak on a 470-acre site near Himont; we hope to use what we learn here to guide long-range retention of pine on the forest.
- Strategic discussions have been initiated with our partners at UMC, MDC, Mark Twain National Forest, the USFS Northern Research Station, and the Jones Center in Georgia concerning possible collaborative research on management practices to promote oak regeneration and uneven-aged structure over time in an ecologically diverse forest.

Goal 2: Demonstrate exemplary stewardship on Pioneer Forest and other L-A-D lands. Our land stewardship work for restoration of shortleaf pine, woodlands, and glades has grown in experience in recent years, guided by one full-time staff member with a six-month-long seasonal work crew. Since 2013, much of the work has been supported by grants from federal and state agencies and private conservation groups. We will augment that effort with the following initiatives and actions:

- Parallel to the increasing harvest on Pioneer Forest, we will provide for a systematic survey of the forest, probably by contract, to identify additional areas for consideration by stewardship and Pioneer Forest staff for protection or special ecological management.
- The board established a Land Consolidation Fund in October 2020 to support continued efforts to address priority acquisitions and dispositions consistent with our land consolidation plan.
- We have secured a three-year grant for \$180,000, beginning in 2021, to provide support for restoration of three or more overgrown glade natural communities on the forest.
- We will build capacity for the stewardship program by hiring an additional staff ecologist,

beginning in 2021 after hiring a new foundation manager, who will supervise the stewardship program and help define duties of the new hire.

- We will continue to pursue our approach toward collaborative conservation on a landscape scale with NPS, MDC, and other partners.
- We will continue to address invasive species with our stewardship crew and in partnership with others; we hired a part-time feral hog elimination specialist for the forest in 2020 and made significant progress in cooperation with the statewide feral hog effort.
- We will improve management and communication with partners regarding potential or actual conflict among uses within trail corridors, and take steps to remedy overuse or inappropriate use wherever they may occur. Our staff developed a new policy in 2020 for management of trails and timber harvest operations in places where the two intersect; staff have erected steel gates at the entrance to some private management roads in places where unpermitted off-road vehicle use has become a problem; and we have secured a trail consultant to prepare a plan for trail redesign to remedy overuse at Hickory Canyons Natural Area.
- The promise of the Roger Pryor Pioneer Backcountry is being realized; L-A-D staff will work with DNR/MSP to advance construction of a new loop trail at Sugar Tree Hollow near Echo Bluff State Park, and we will consider a possible trail in the Big Creek area.

GOAL 3: Increase the scope of L-A-D's influence by optimizing public/private collaboration and leveraging resources to maximize effectiveness and benefits in the Missouri Ozarks and beyond.

- We have increased our budget for our grants program, and staff have streamlined the application process and are doing more coaching as needed for potential new grant recipients.
- L-A-D staff and directors are currently engaged with partners on public policy regarding road and trail matters at ONSR, easement protection on the Eleven Point River, MDC's Comprehensive Conservation Strategy, and statewide elimination of feral hogs. We recognize the opportunity and need to do even more public policy work.
- Our new foundation manager (when hired in 2021) is expected to engage in L-A-D outreach at state and national levels, likely including matters related to recertification of Pioneer Forest, encouragement of shortleaf pine markets in Missouri, and increasing collaborative research on uneven-aged management and regeneration.
- We have discussed changing the name of the foundation to more clearly recognize the name of our founder, but have no plans at this time.
- We are considering contracting for a marketing, communications, and social media plan tied to our strategic goals and for an analysis of economic and ecosystem services (including carbon sequestration) of L-A-D's lands and programs; these studies await the new foundation manager.
- In stakeholder discussions with land management partners such as MDC, MTNF and others, we have indicated our interest in collaboration on programs to encourage better management of private wooded lands; further development awaits the new foundation manager.

GOAL 4: Develop and sustain an organizational structure that enables L-A-D to accomplish its charitable mission and purpose in perpetuity.

- The L-A-D board is committed to increasing diversity on the board, advisory council, and staff, but progress to date is slow.
- We continue efforts to improve communications with the Drey Family Advisory Council.
- Our previous business manager began a comprehensive evaluation of staffing needs tied to the strategic plan, but that effort had to be truncated owing to the press of other priorities. Nevertheless, we have added two forester positions (plus one reassignment to field supervisor and a part-time feral hog trapper) to the Pioneer staff; increased the duration of the seasonal stewardship crew, and hope to add a second full-time ecologist in 2021; and we have developed

a job announcement for a new foundation manager position to be posted in early January 2021.

- All L-A-D and Pioneer Forest human resources policies have been updated, reviewed by attorneys, and incorporated in a new combined employee manual for all staff approved by the board in summer 2020.
- The board recognizes its fiduciary responsibility to understand and manage its financial assets in accord with its charitable mission and purposes. A long-sought consolidation of financial reporting for Pioneer Forest and L-A-D Foundation was begun in 2020 and is nearing completion, with advice from our accountants.
- The board and staff have agreed on a basic framework for organizational structure that will involve dual reports to the board by the new foundation manager and the forest manager, with supervision of forestry staff by the forest manager and supervision of stewardship and business staff and related contractors by the foundation manager, but details remain to be worked out.
- Several directors are working on a document to review and summarize all delegations of authority for consideration by the board at its January 2021 meeting.
- Board members have begun discussion and initial outreach for advice regarding corporate structure.
- The board recognizes its responsibility to sustain and improve L-A-D's land-based assets and operations in accord with its charitable mission in perpetuity. A board-designated endowment to provide for lands, basic operations, and charitable mission has been established and funded with an initial \$1 million.

BOARD ESTABLISHES ENDOWMENT AND LAND CONSOLIDATION FUNDS

In April the L-A-D Foundation Board of Directors approved a resolution establishing a board-designated endowment to help ensure the perpetuity of the foundation, including its charitable programs and landed assets. The resolution recognizes the necessity of skilled staffing to maintain its charitable programs and manage its lands even in the event of severe economic or natural disruptions. Revenues of the foundation are heavily dependent on the productivity of its demonstration forest and markets for its products. Yet the forest is vulnerable to foreseeable or unforeseen events such as drought, climate change, tree diseases, insects, uncontrolled fires, windstorms, and fluctuations in timber markets.

To address these financial risks, discussed during our strategic planning, the board-designated endowment would allow management and conservation of Pioneer Forest and the charitable activities of the L-A-D Foundation to continue in the event of severe decline in income from the forest. Starting with a \$1 million investment in 2020, the goal is to reserve enough money in our budget each year to reach \$10 million in ten years and ultimately a large enough endowment, estimated at \$18 million, to ensure that the foundation's lands and programs are sustained in perpetuity.

At its October meeting, the board also authorized a land consolidation fund, beginning with \$1 million, with the intent that grants for land consolidation, revenues from land sales, or other L-A-D funds would be added as needed over time. During the past fifteen years the foundation has pursued land consolidation to further protect its existing lands and key watersheds, improve access, and increase management efficiency. Our targeted approach has included a series of transactions within Pioneer's Roger Pryor Backcountry as well as additions to our natural areas at Hickory Canyons and Ball Mill Resurgence. We have also traded or sold relatively small, isolated, or hard-to-manage parcels. The strategic planning process re-affirmed the importance of this work in fulfilling the foundation's mission and proposed a dedicated account to ensure adequate funds.



Land acquired at Wildcat Mountain in the Roger Pryor Backcountry. GREG IFFRIG

L-A-D REMEMBERS ESTEEMED TREASURER WAYNE GOODE

The passing of L-A-D Foundation Director Wayne Goode leaves a large hole in our board ranks and in our hearts. Wayne's passing is a huge loss for the foundation, the state, and of course for his family and many friends.

Wayne joined the L-A-D board at its annual meeting in October 2000. He was elected treasurer in 2001 and served in that role until his death. After Leo and Kay Drey donated Pioneer Forest to the foundation in 2004, Wayne spearheaded the development of appropriate accounting systems, finance and investment policies, human resource policies, and financial reserves. He was very energetic in coordinating with the business manager to accomplish prudent, active management of the foundation's assets.

As an experienced legislator with 42 years in the Missouri House and Senate, Wayne was willing to take on complex issues; his focus on the environment enabled him to develop the knowledge and relationships that made him a valuable board member. He counseled the board on environmental and conservation issues, helped the board and staff to connect with other organizations, and shared his understanding of state and federal government and agencies.

Wayne's keen interest in environmental sustainability combined with his love of canoeing and hiking in the Missouri Ozarks made him a natural fit for the L-A-D board. He was also a respected champion for many civic and resource stewardship causes in our society. His personal qualities and financial acumen deeply influenced our operation and will continue to do so for years to come.



Wayne Goode



*Advisory Council member David
Larsen and Wayne on a 2019 field trip.*
ABOVE PHOTOS: L-A-D FOUNDATION ARCHIVES



Above: Wayne presents Kay Drey with the Post-Dispatch Weather Bird drawn in memory of Leo Drey during Leo's Celebration of Life in 2015.

Left: Jane and Wayne Goode with Kathleen Henry (right) at our Spring 2015 community barbecue. BOTH PHOTOS: DENISE HENDERSON VAUGHN

FOUNDATION WELCOMES TWO NEW BOARD MEMBERS

In October, the L-A-D Board elected and welcomed two new directors, Mike Smith of Washington, Missouri, and Adam Saunders of Columbia.

Mike Smith holds a B.S. in industrial arts education from the University of Missouri-Columbia and taught in the Washington School District for 25 years. He also ran a small business doing carpentry and cabinetmaking for eight years. An owner of forest land in the Ozarks, he has been familiar with Pioneer Forest for years and included discussion of its sustainable forestry methods in his teaching curriculum.

Mike chaired the Washington Urban Forestry Council for 12 years. This group planted hundreds of native trees around the city and produced a riverfront management plan. He started a volunteer group that continues its implementation. He was chosen to be the first land steward for Shaw Nature Reserve and has been overseeing the restoration of 16 acres along Brush Creek for the past three years. He is an avid reader and has spent much of his life studying the natural history of Missouri.

Adam Saunders is the co-founder and development director of the Columbia Center for Urban Agriculture (CCUA), a non-profit that educates underserved populations in home gardening and local foods and in the process produces fresh produce for the Central and Northeastern Missouri Food Bank. He graduated from University of Missouri-Columbia with dual forestry and statistics majors in 2008 and earned a master's degree in forestry in 2010, also from UMC.

He is also the visionary partnership builder and campaign director for Columbia's Agriculture Park, a remarkable \$7+ million public-private partnership with Columbia Parks and Recreation, CCUA, Columbia Farmers Market, Sustainable Farms & Communities, Columbia Public Schools, MU Health Care, MU Extension, the Food Bank, and leaders of Columbia's Black community. This partnership is developing 10 acres of park space into a working urban farm with outdoor classrooms, pollinator habitat, and a large permanent farmers market pavilion. Adam also operates a small apple tree nursery in downtown Columbia and installs and manages small orchards in the Missouri River hills.

We welcome Mike and Adam and look forward to involving them in our initiatives.

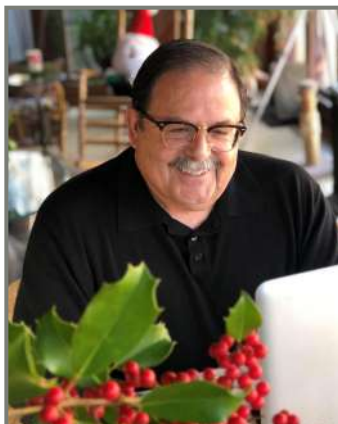


Mike Smith



Adam Saunders

BOARD MEMBER STEVE MAHFOOD HONORED BY MISSOURI ENERGY INITIATIVE



Steve Mahfood accepts award from his home.

ELIZABETH PETERSEN

On December 9 during a virtual conference, L-A-D board member Steve Mahfood received the first Jim Fischer Lifetime Achievement Award from the Missouri Energy Initiative. It was his second such award in two years (see article in 2019 annual report). The criteria for this award included long service to the state, leadership, ethical behavior, getting results, and working in multiple fields. Along with Jim Fischer and Wayne Goode, Steve was a co-founder of the Initiative and served on its board until he joined the L-A-D board.

After various positions in planning, health administration, and environmental work in Africa and the Middle East, Steve served 14 years as director of MoDNR's Energy Improvement and Environmental Resources Authority followed by seven as DNR director. On the L-A-D board, Steve has taken keen interest and offered valuable insight and suggestions on virtually all aspects of L-A-D and Pioneer Forest programs, and co-chaired a carbon task force that secured a carbon study of the forest. Our hearty congratulations to Steve.

JASON GREEN NAMED FOREST CONSERVATIONIST OF THE YEAR

Pioneer Forest Manager Jason Green was named the Forest Conservationist of the Year by the Conservation Federation of Missouri during its annual convention on March 6 in Jefferson City. Jason joined our staff in 2008 and assumed leadership of Pioneer Forest in 2013. This award recognizes significant contributions and professional leadership in the field of forestry.

Working closely with his chief forester Brandon Kuhn, Jason has hired, trained, and grown nearly the entire third generation of forestry staff on Pioneer, shaping a smooth-functioning and efficient team. Working and learning together they have been able to meet new challenges such as developing more accurate CFI measurement techniques, shifting from scaling standing trees for volume to selling by weight, modifying marking to increase the amount of regeneration, and encouraging increased

ecological stewardship and research on the forest. He and his team also completed a superb new management plan for the forest in 2019.

Jason is a respected board member of the Missouri Forest Products Association and the Missouri Forest Resources Advisory Council, and he has increased our participation in regional conservation programs and has expanded our capacity for outreach to and collaboration with other state, national and international organizations. Congratulations to Jason for this well-deserved honor.



Left to right: Conservation Federation of Missouri President Gary Van de Velde, Jason Green, and CFM Executive Director Tyler Schwartze.

PHOTO COURTESY OF CONSERVATION FEDERATION OF MISSOURI

CLARE HOLDINGHAUS-IRELAND LEAVES FOR VERMONT

Clare Holdinghaus-Ireland began working with the L-A-D Foundation in January of 2015. After growing up in St. Louis, she graduated from Beloit College, then returned to work with the AmeriCorps St. Louis Emergency Response Team. Her spirited and positive attitude came across during her interview. Just days later she started work as our office manager. In a few short years she had mastered QuickBooks, accounting, and our investment funds, and had worked so effectively with Treasurer Wayne Goode and Forest Manager Jason Green to improve our systems that the board promoted her from office manager to business manager.

Staff, board, and all our contractors and partners enjoyed Clare's can-do attitude and spirit of teamwork. We are particularly grateful for her herculean efforts in her last months with us to get us pointed in the right direction to implement our new strategic plan, including tuning up our human resources policies and virtually completing the intricate task of consolidating our financial reporting. She also conducted two comprehensive and enlightening financial trainings for the board and key staff, and helped to find and then onboard a worthy successor, all despite Covid restrictions.

We safely distanced on June 26 around the big rotunda skylight on the third floor of the Security Building to wish her all the best in her new home and new job in Waitsfield, Vermont. We consider Clare to be a fast friend of the L-A-D Foundation and hope to see her whenever she visits Missouri.



JENNIFER POTRATZ JOINS L-A-D AS BUSINESS MANAGER

Jennifer Potratz joined the team on May 26 as our new business manager. Her professional experience with nonprofit program management and her commitment to environmental policy, scientific research, education, and community development align closely with the mission and programs of the L-A-D Foundation. We knew we had found a likely successor to Clare when it became obvious that she had not only studied our website but read our annual reports prior to her first interview.

With early experience guiding outdoor education trips in the Ozarks and a conservation biology degree from the University of Missouri-Columbia, she earned an M.A. in natural resource management from Idaho State University. She contributed to several national park and national forest interagency management plans during a fellowship with the Greater Yellowstone Coalition. While living in Southeast Alaska for seven years, Jennifer worked with many Alaska Native tribes developing environmental monitoring and health education programs. For the University of Alaska Sitka Forest Products Program, she conducted ethnobotanical field research, studied the nutritional content of local subsistence foods, and helped implement sustainable harvesting practices.

Returning to St. Louis, Jennifer held non-profit management roles with the Missouri Botanical Garden, the Botanical Society of America, and the Donald Danforth Plant Science Center. She taught college field courses on climate change (Montana) and forest ecology and policy (Alaska). She enjoys encouraging people to connect with their landscape and practice good stewardship. Jennifer is delighted to work for the L-A-D Foundation, saying “It’s the perfect place to devote my time and energy.”



*Jennifer Potratz with L-A-D Foundation
Treasurer Wayne Goode. PETER GOODE*

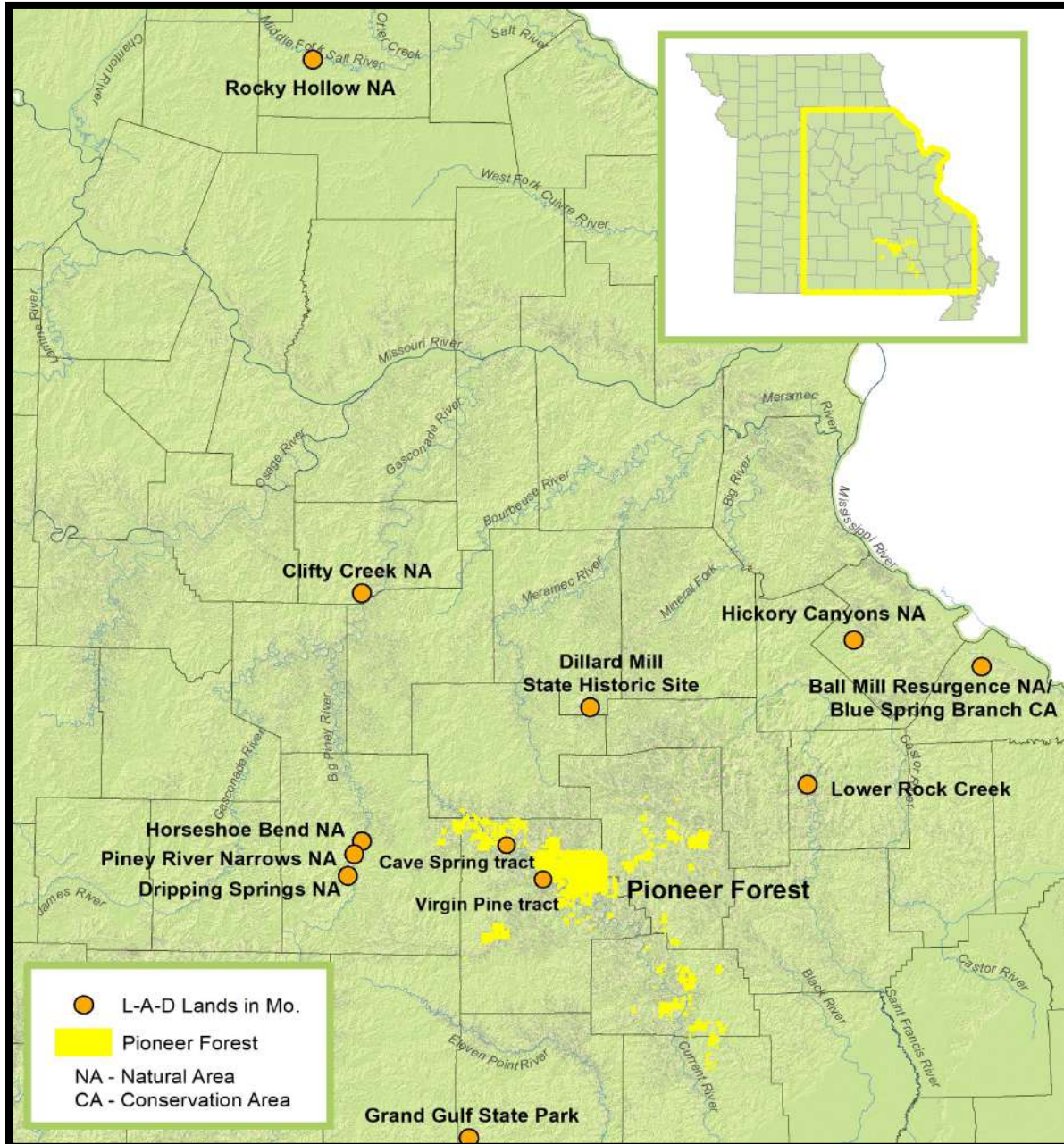
L-A-D INITIATES SEARCH FOR A FOUNDATION MANAGER

Our longest-serving staff member, Liaison to the Board Greg Iffrig, has announced his retirement as of early May, so in January we are initiating a search for his successor. Having been told of his intention to retire in 2021 as we began our strategic planning in 2019, we have given special thought to how his position might be reconfigured to fit the goals and initiatives of the foundation going forward. Our concept is a Foundation Manager who would work in tandem with our Forest Manager.

Greg Iffrig was hired by Leo Drey in 1992 into a new position as chief of recreation and reserves. With a background in ecology, he worked with Leo's Pioneer Forest staff learning timber marking and other aspects of the operation while also developing more trails in the backcountry. He also began working regularly with MDC, State Parks, Ozark Riverways and other partners on plans, issues, and trails for natural and other special areas owned by the L-A-D Foundation. And, he did a lot of writing—articles, interpretive brochures, annual reports—and organized a 2001 symposium for Pioneer's 50th anniversary. Following Leo and Kay Drey's 2004 donation of Pioneer to L-A-D, he began working from Leo's St. Louis office in a new role as Liaison to the Board, helping the board restructure the foundation to take on its new responsibilities. He also led a new land consolidation effort, organized board/staff field trips to L-A-D lands and to forests elsewhere, strengthened the stewardship staff and programs, and made significant contributions to the Pioneer and L-A-D 2011 and 2019 management and strategic plans.

The new foundation manager will have responsibility for supervising the staff of the St. Louis office and the stewardship program for both the forest and other lands, and for closely coordinating with the Pioneer Forest Manager and the board. The position will also be responsible for developing expanded outreach, policy, education and communications programs organized around new initiatives such as collaborative research on uneven-aged forest structure, new markets for shortleaf pine and wood products, and better management of private woodlands. The position has been posted on several regional and national job boards and on the L-A-D website. We hope to begin interviews in February in order to identify a candidate in March and allow about a month of overlap with Iffrig before he retires.

Appendices



MAP OF L-A-D FOUNDATION LANDS

LIST OF L-A-D FOUNDATION LANDS

PIONEER FOREST AND ITS SPECIAL AREAS

144,064 ACRES

<u>SPECIAL AREA</u>	<u>COUNTY</u>	<u>SPECIAL DESIGNATION</u>	
Blair Creek Hanging Fen	Shannon	Forest Reserve, ¹ 2011	25 acres
Bluff School, Medlock Cave	Shannon	Forest Reserve, 1995	51 acres
Capps Hollow Glades & Fens	Shannon	Ecological Management Area, 2019	297 acres
Chalk Bluff	Shannon	Forest Reserve, 2019	65 acres
Cookstove/Squaredance Cave	Shannon	Forest Reserve, 2015	12 acres
Cunningham Sink	Shannon	Forest Reserve, 2011	24 acres
Current River NA	Shannon	SAF Natural Area, ² 1955, and State Natural Area, ³ 1977, 10 acres; Addition, Natural Area, 2005, 255 acres; Total area	265 acres
Fishtrap Hollow & Marshy Spring Hollow Fens	Shannon	Forest Reserve, 1995	45 acres
Jerktail Mountain	Shannon	Ecological Management Area, 2015	1,160 acres
Laxton Hollow	Shannon	Forest Reserve, 1995	145 acres
Leatherwood Creek	Shannon	Forest Reserve, 1995	1,003 acres
Lily Pond NA	Reynolds	State Natural Area, 1975	8 acres
Old Schoolhouse Hollow	Shannon	Forest Reserve, 1995	140 acres
Pine-Oak Woodland	Shannon	Ecological Management Area, 2015	500 acres
Pineknot Shortleaf Pine	Carter	Ecological Management Area, 2015	330 acres
Pioneer NA	Shannon	SAF Natural Area, 1964, and State Natural Area, 1977	20 acres
Satterfield Hollow	Shannon	Forest Reserve, 2019	522 acres
Sinkhole Ponds Complex	Reynolds	Forest Reserve, 1995	45 acres
Sutton School Hollow Fens	Shannon	Forest Reserve, 1995	75 acres
Tall Larkspur	Shannon	Ecological Management Area, 2015, 85 acres; Addition, 2019, 56 acres; Total area	141 acres
Thompson Creek Glade & Fens	Shannon	Ecological Management Area, 2019	125 acres
Triple Sink/ Sunklands NA ⁴	Shannon	State Natural Area, 1980, 23 acres; Addition of 19 acres included as part of Sunklands Natural Area in 1999; Total area	42 acres
Tufa Creek	Shannon	Forest Reserve, 2011	116 acres
Woods Hole	Shannon	Forest Reserve, 2019	58 acres

RIVERWAYS CORRIDOR LANDS

1,123 ACRES

Scenic Easements	Shannon, Carter	National Park Service, Ozark National Scenic Riverways, 1970	951 acres
Cave Spring	Shannon	Adjacent to the Current River	172 acres

LANDS LEASED TO THE MISSOURI DEPARTMENT OF CONSERVATION (MDC)

2,419 ACRES

Ball Mill Resurgence/ Blue Spring Branch CA	Perry	State Natural Area, 1979, 19 acres; addition of 183 acres in 2007; addition of 71 acres in 2012; addition of 89 acres in 2018 addition of 1 acre in 2020 Total acres under lease	363 acres ⁵
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<u>SPECIAL AREA</u>	<u>COUNTY</u>	<u>SPECIAL DESIGNATION</u>	
Clifty Creek	Maries	State Natural Area, 1971	
		Total acres under lease	230 acres
Dripping Springs	Texas	State Natural Area, 1973	
		Total acres under lease	9 acres
Hickory Canyons	Ste. Genevieve	State Natural Area, 1973, 420 acres; addition of 561 acres in 1979; addition of 18.68 acres in 2013; addition of 95 acres in 2014; addition of 40 acres in 2016;	
		Total acres under lease	1,135 acres
Horseshoe Bend	Texas	State Natural Area, 1973, 69 acres	
		Total acres under lease	233 acres ⁵
Piney River Narrows	Texas	State Natural Area, 1971, 50 acres	
		Total acres under lease	258 acres ⁵
Rocky Hollow	Monroe	State Natural Area, 1973, 188 acres; National Register of Historic Places, 1974;	
		Total acres under lease	191 acres ⁵
<u>LANDS LEASED TO MISSOURI DEPARTMENT OF NATURAL RESOURCES</u>			289 ACRES⁶
Dillard Mill	Crawford	State Historic Site, 1977	130 acres
Grand Gulf State Park	Oregon	National Natural Landmark, ⁷ 1971 and State Park, 1984, 159 acres State Natural Area, 1986, 60-acre portion	
		Total acres	159 acres
Trails and Trailhead of the Roger Pryor Pioneer Backcountry	Shannon	Lease to Missouri State Parks, 2014 More than 65 miles of trails existing or under construction	
<u>OTHER LANDS</u>			267 ACRES
Lower Rock Creek	Madison	Wild land	226 acres
Virgin Pine	Shannon	Scenic remnant corridor	41 acres
TOTAL L-A-D FOUNDATION LAND OWNERSHIP			148,162 ACRES

¹The concept of Forest Reserves was initially discussed by Pioneer Forest staff in 1994. In 1995 the management plan for each of these areas was described along with its boundaries. Following Leo Drey's agreement and the endorsement of the Foundation Board, the program was adopted. Additions were made in 2011 and 2019.

²The Society of American Foresters' Committee on Natural Areas was organized in 1947.

³The Missouri Natural Areas System began in 1971 with the first areas owned or leased by the Missouri Department of Conservation. Beginning in 1977, the Missouri Natural Areas Committee was established by agreement of the Missouri Department of Conservation and the Missouri Department of Natural Resources to review and approve natural areas throughout the state under a variety of public and private ownerships.

⁴Originally designated as a Missouri Natural Area in 1980 under the ownership of the Frank B. Powell Lumber Company; acquired by the L-A-D Foundation in 2006. This area is now included as part of the 6,295-acre Sunklands Natural Area.

⁵The foundation's Ball Mill Resurgence/Blue Spring Branch, Horseshoe Bend, Piney River Narrows, and Rocky Hollow each include designated Missouri Natural Areas within a large L-A-D purchase that is now leased.

⁶State Historic Sites and State Parks are managed by the Missouri Department of Natural Resources, Division of State Parks. The Trails of the Roger Pryor Pioneer Backcountry are leased to the MoDNR and are part of Pioneer Forest.

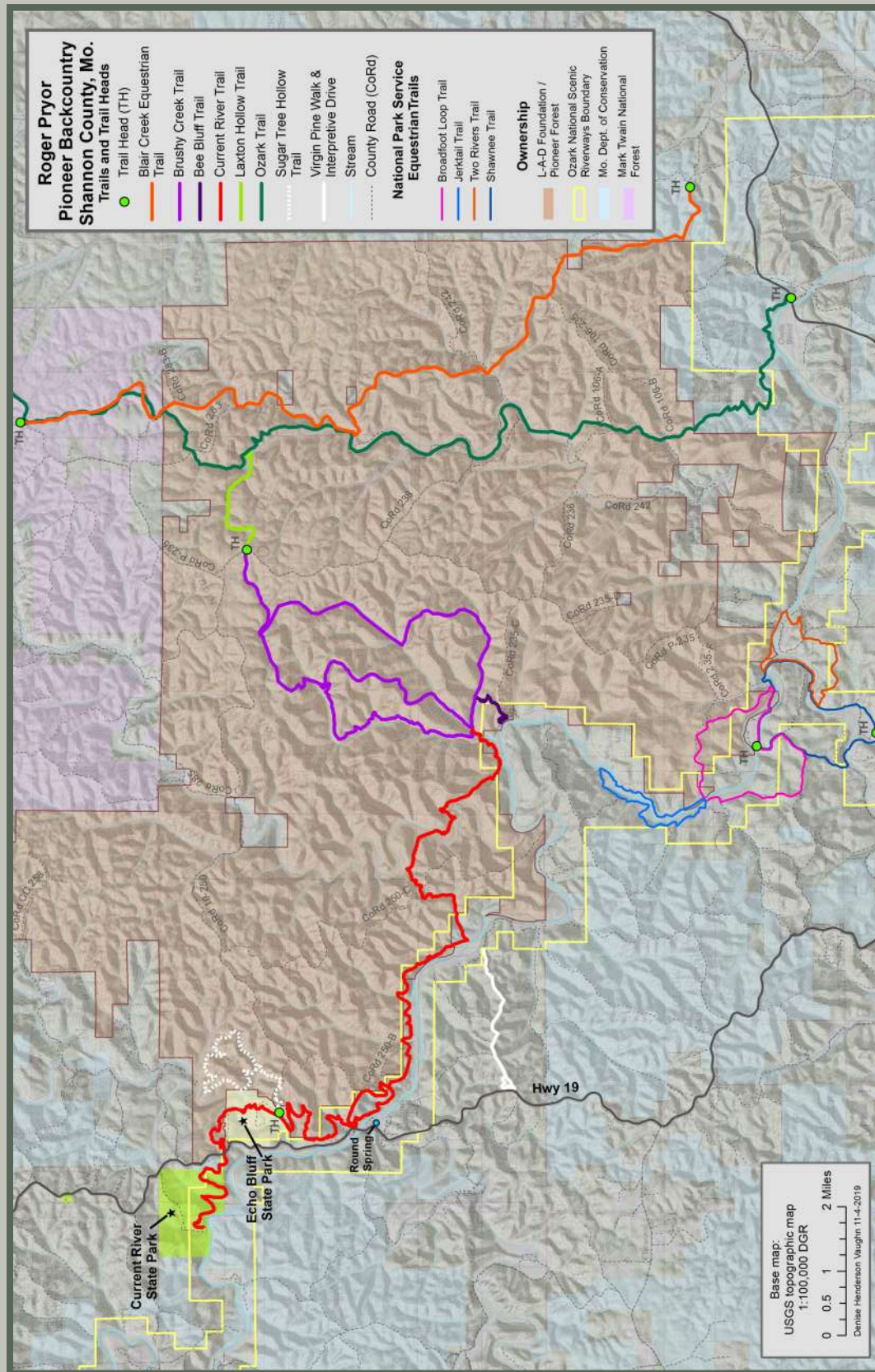
⁷The National Natural Landmarks program is administered by the National Park Service. Grand Gulf is among fewer than 600 sites designated in the United States.

LIST OF L-A-D FOUNDATION TRAILS

- **Ball Mill Resurgence Trail**, Perry County: A one-mile trail loops from a small parking lot into the Blue Spring Branch valley and the resurgence.
- **Blair Creek Section, Ozark Trail**, Shannon County: The 12.5-mile route through Pioneer Forest was the very first section of the well-known Ozark Trail to be completed in the late 1970s.
- **Blair Creek Equestrian Trail**, Shannon County: This 11.7-mile trail provides equestrians a route through the Backcountry, connecting Mark Twain National Forest and Missouri Department of Conservation lands.
- **Brushy Creek Trail**, Shannon County: A 21.4-mile nested loop trail, including a 1.9 mile spur leading to Bee Bluff, provides access to the interior of our Roger Pryor Pioneer Backcountry. Access to this trail is from the Himont Trailhead on County Road P-235 in Shannon County.
- **Cave Spring Trail**, Shannon County: A 4.6-mile moderately difficult round-trip hike connects Devils Well and Cave Spring, crossing Pioneer and National Park Service lands with access at Devils Well.
- **Clifty Creek Natural Area Trail**, Maries County: A 2.5-mile walk with scenic overlooks across the Clifty Creek valley, near the creek junction with the Gasconade River.
- **Current River Trail**, Shannon County: This 12-mile hiking route connects Echo Bluff State Park via Round Spring on the west side of Roger Pryor Pioneer Backcountry with the Brushy Creek Trail farther east.
- **Current River Trail Extension**, Shannon County: A one-mile segment of this trail crosses through the Backcountry connecting Current River and Echo Bluff state parks.
- **Dillard Mill State Historic Site Trail**, Crawford County: A 1.5-mile trail winds through a hillside of oak, hickory, and pine, with benches for visitors to stop and enjoy the sights and sounds of the Huzzah Creek valley.
- **Grand Gulf State Park Trails**, Oregon County: From the parking lot, several short paths top the gulf and overlook the collapsed cave system. A short boardwalk/stairway (0.25 mile) leads to a viewing platform at the bottom of the gulf. A loop trail (0.80 mile) takes visitors across the natural bridge, alongside the gulf, and then through a very interesting mature oak woodland on the plateau.
- **Hickory Canyons Natural Area Trails**, Ste. Genevieve County: There are two trails through this beautiful area. One is an easy quarter-mile walk to a waterfall, and a second is a one-mile loop through the La Motte sandstone canyon.
- **Horseshoe Bend Natural Area Trail**, Texas County: A one-mile route leads from a small parking area across a scenic ridge that overlooks the Big Piney River and proceeds to the river bottom.
- **Laxton Hollow Trail**, Shannon County: A 2.3-mile route begins at the Himont Trailhead and leads to Laxton Spring before connecting with the Ozark Trail at Blair Creek.
- **Pioneer Forest Interpretive Drive**, Shannon County: A two-mile interpretive drive through Pioneer Forest shows visitors the half-century tradition of Pioneer's careful and conservative method of selectively harvesting trees. The drive starts along the east side of Highway 19 near the Virgin Pine Walk.
- **Sugar Tree Hollow Trail** (to be constructed), Shannon County: A 5.3-mile route exploring a small side hollow to Sinking Creek. Access is from Echo Bluff State Park.
- **Virgin Pine Walk**, Shannon County: This quarter-mile interpretive walk south of Round Spring leads through an old shortleaf pine stand where some trees are more than 200 years old.

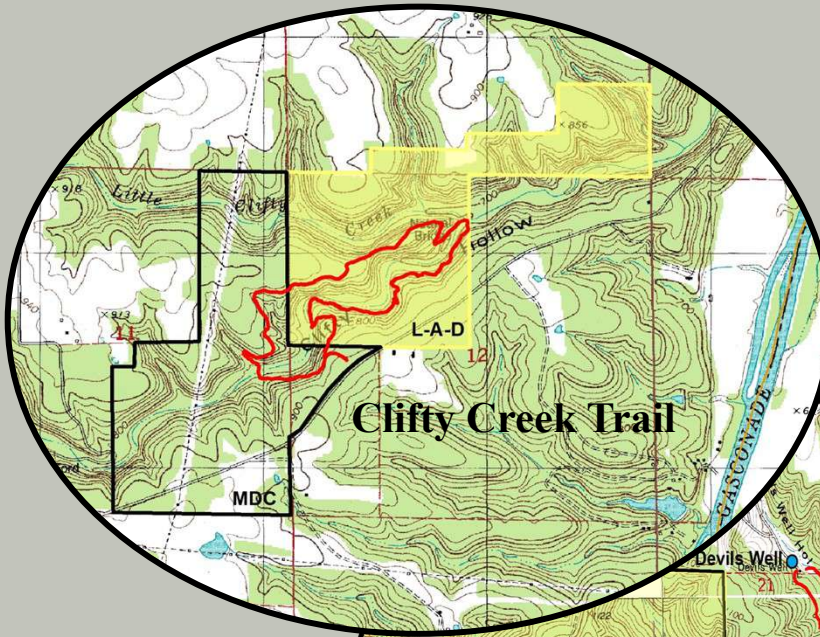
NOTE: The NPS Ozark National Scenic Riverways equestrian trails are shown on the south side of the Backcountry map (see next page). The Broadfoot Equestrian Loop Trail shown in purple connects riders between Griggs Ford and the Broadfoot Ford. A small piece of Two Rivers Equestrian Trail crosses Pioneer on a route parallel to the Current River.

MAP OF THE TRAILS OF THE ROGER PRYOR PIONEER BACKCOUNTRY

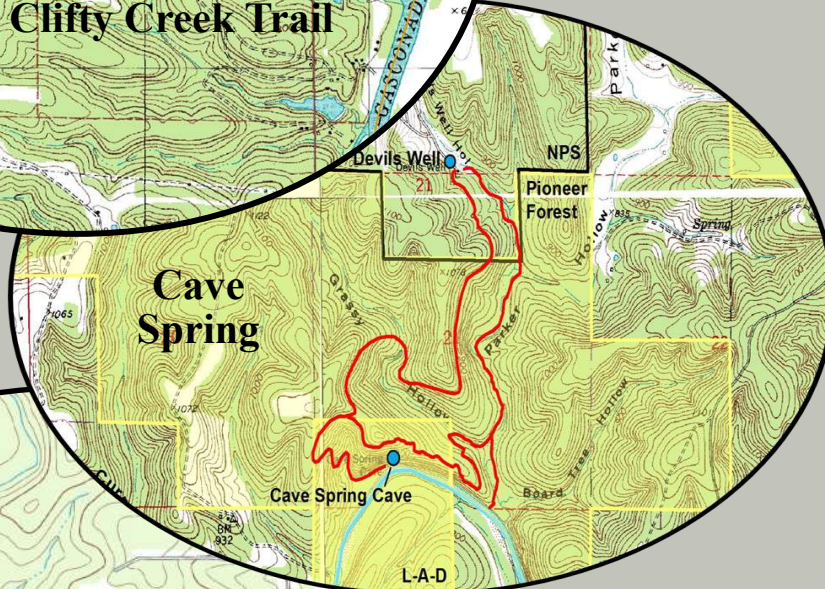


The Laxton Hollow Trail, middle segment of the Brushy Creek Trail, and the Current River Trail have been named as the Upper Current Section of the much longer Ozark Trail. Access a digital map or review a larger image here: <https://ladfoundation.org/pioneer-forest/roger-pryor-pioneer-backcountry/>

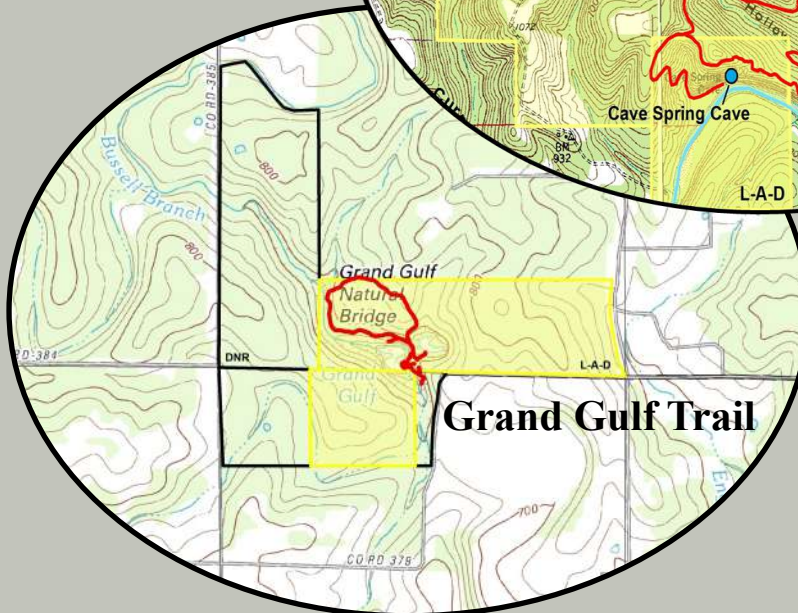
MAPS OF OTHER TRAILS ON L-A-D FOUNDATION LANDS



The Clifty Creek Trail (left) in Maries County crosses the L-A-D Foundation's Clifty Creek Natural Area, which joins the Missouri Conservation Department's Clifty Creek Conservation Area. It is approximately 2.5 miles long.



The Cave Spring Trail (above) in Shannon County begins on Ozark National Scenic Riverways land and continues across the foundation's Pioneer Forest to Cave Spring on the Current River. It is 4.6 miles long.



The Grand Gulf Trail (above) in Oregon County roughly traverses the perimeter of the gulf, giving hikers a view down into this mile-long collapsed cave. The trail is approximately .8 miles long.

GLOSSARY OF TERMS

Acre – A unit of land area measurement equal to 43,560 square feet.

Age class – An aggregation of trees essentially of the same age. Age class is often used synonymously with “size class.” Age intervals of 10 years are commonly considered to be the same age class.

Aquatic invertebrate taxa – Includes a range of organisms, such as snails, crustaceans, insect larvae, leeches, and aquatic worms.

Aspect – The cardinal direction that a slope faces (north, south, east, west).

Avifauna – Avian wildlife, birds.

Basal area – The area (in square feet) of the cross section of a tree stem, including the bark, generally at breast height (4.5 feet above the ground). In the aggregate, it is the total cross-sectional area per acre of all trees at breast height.

Biological diversity (biodiversity) – The existence of a variety of plants, animals, and other living beings in particular regions or ecosystems.

Blocking – Structural wood products used to package and ship manufactured goods.

Board foot – Unit for measuring wood volume and commonly used to express the amount of wood in a tree, sawlog, or piece of lumber. A piece of wood one foot wide by one foot long by one inch thick.

Bolt – A short log or a squared timber cut from a log, usually less than eight feet in length.

Buffer strip – A strip of vegetation that is left unmanaged or is managed to reduce the impact that a treatment or action on one area would have on an adjacent area.

Canopy – The more or less continuous cover of branches and foliage formed collectively by the tops, or crowns, of adjacent trees.

Canopy closure – The progressive reduction of space between tree crowns as they spread laterally.

CFI – Continuous Forest Inventory was first conducted on Pioneer Forest in 1952 and includes fixed plot centers where the same trees are remeasured every five years to obtain growth and yield estimates. (CFI was in use in Europe before being adapted in the United States, and officially in the Lake States in 1946. Much credit for the adoption of this system of forest measurement goes to Cal Stott of the Ford Forestry Center, who measured 140 plots in 1938 and remeasured them in 1958 [Forestry Bulletin No. 5: Continuous Forest Inventory with Punch Card Machines for a Small Property, Stephen F. Austin State College, Dept. of Forestry, Nacogdoches, TX]. Stott came to Missouri to train forest staff at Pioneer Forest at the start of every inventory through 1972.)

CFM – Conservation Federation of Missouri; the L-A-D Foundation is an affiliated member.

Chrono-sequence – Forest stands covering a range of ages and management-related disturbances.

Clear-cut – A harvest method used in the even-aged silvicultural system. The removal of all merchantable and non-merchantable trees greater than 1.0 inch in diameter in one harvest cut. Pioneer Forest management does not include the use of clear-cutting.

Community – An assemblage of plants, animals, bacteria, and fungi that live in an environment and interact with one another, forming a distinctive living system with its own composition, structure, environmental relations, development, and function.

Conservative species – Plants or animals associated with an intact natural community, generally defined as species that have evolved over millennia to thrive in a very specific set of ecological conditions. In the absence of these conditions, populations of conservative species may decline rapidly, particularly in reaction to abrupt changes in the environment. For example, a non-conservative plant species may be found abundantly along roadsides and old fields, whereas more conservative plants may only be found in undisturbed natural areas.

Cord – A unit of gross volume measurement for stacked roundwood based on external dimensions; generally a 4 by 4 by 8-foot stack (128 cubic feet of stacked wood).

CRF – Cave Research Foundation, an organization that grew out of efforts during the 1940s to explore the Mammoth Cave area of Kentucky. (Among several operations in the United States is the foundation's formalized support of efforts in Missouri which began in 1987 and includes work on L-A-D Foundation land.)

Cross-tie – A transverse timber forming a foundation or support.

Cull – Tree or log of merchantable size that, because of defect, is not merchantable but may be saved as a den tree.

Customary rights – Rights that result from long habitual or customary actions that have, by such repetition and by uninterrupted acquiescence, acquired the force of law within a geographical or sociological unit.

Cutting cycle – The planned interval between partial harvests in an uneven-aged stand.

Dendrochronology – The study of tree rings and tree ring patterns influenced by environmental factors such as climate and fire. Analyzing annual growth increments helps us to understand the age of a tree or a forest canopy and to compare responses to change between species and within a forest or a region.

Den tree – A living tree with a cavity large enough to shelter wildlife. Also called a cavity tree.

Diameter breast height (dbh) – Diameter of a tree measured on the uphill side of the tree at 4.5 feet (breast height) above ground line.

Disturbance regimes – Any of a variety of events, such as wind, floods, and/or fires, that cause a significant change in the local or regional environment and the associated plants or animals.

Dolomite – A carbonate sedimentary rock consisting of double carbonates of calcium and magnesium. Associated in Missouri with karst topography.

Duff – Partly decayed organic matter on the forest floor.

Ecological Management Area (EMA) – Internal L-A-D/Pioneer Forest designation where ecological management is the primary goal. Prescribed fire and timber management are often necessary to meet and maintain our ecological goals. Examples include Jerktail Mountain EMA and Tall Larkspur EMA.

Ecosystem – A conceptual unit comprised of organisms interacting with each other and their environment, having the major attributes of structure, function, complexity, interaction and interdependency, and temporal change with no inherent definition of spatial dimension.

Endangered species – Any species in danger of extinction throughout all or a significant part of its range. Endangered species may be state or federally listed.

Erosion – The displacement of soil from one place to another by any means, including wind, water, gravity, logging, road building, and fire.

Even-aged management – A system of forest management in which stands of trees are maintained or cut with relatively minor differences in age, usually less than 10 percent of the rotation.

Even-aged silvicultural system – The application of a combination of actions that results in the creation of stands of trees of essentially the same age that are growing together. Managed even-aged forests are characterized by a distribution of blocks of single-age stands (and therefore, tree size) throughout the forest area. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time a stand has reached the desired age or size and is harvested. Clear-cut, shelterwood, or seed tree cutting methods produce even-aged stands.

Exotic species – Species that would not occur naturally in the location where they are found.

Federally listed – Animals or plants formally added to the federal lists of endangered or threatened wildlife or plants by the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service. In legal terms, this also includes species formally proposed for addition to these lists.

Fen – A type of wetland characterized by pH neutral or alkaline chemistry of the water. Fens are usually fed by mineral-rich groundwater sources and are dominated by grasses and sedges.

Feral – Having escaped or been released from domestication and become wild, for example feral hogs.

Fluctuating asymmetry (FA) – A measure of developmental stability based on genetic complexity.

Forest – Generally defined as an area dominated by trees with greater than 60% canopy cover and interspersed with multilayered shade-tolerant sub-canopy trees, shrubs, vines, ferns and ground flora that is rich in spring ephemerals. Trees often attain heights from 60 to more than 100 feet.

Forest Reserve – Pioneer recognizes high-quality, characteristic Ozark features and some typical forest features on its lands. These could be of state-wide significance, but recognized mainly for their regional importance or for their importance to the forest.

Forest structure – Layers of vegetation within a forest, in general: seedlings, advanced reproduction, saplings, poles, and overstory. Except for seedlings, each layer can include multiple age classes.

Fragipan – Loamy, brittle subsurface soil layer low in porosity and organic matter, and low or moderate in clay, but high in silt and fine sand. A fragipan appears to be cemented and restricts roots.

GIS/GPS – Geographic Information System that tells us where a particular oak is within the forest; compared to GPS (Geographic Positioning System), which tells us the point where we are within the forest.

Glade – Open, exposed bedrock areas dominated by drought-adapted herbs and grasses in an otherwise woodland or forest matrix.

Harvest cycle – The time period between harvest entries when using an uneven-aged management system.

Harvest rotation – The time period between harvests when using an even-aged management system.

HCVF – High Conservation Value Forests – Those forests that possess one or more of the following attributes: (1) globally, regionally, or nationally significant concentrations of biodiversity (e.g. endangered species) and/or large landscape-level within the management unit, where viable populations of mostly naturally occurring species exist in natural patterns of distribution and abundance; (2) forest areas that contain rare, threatened, or endangered species; (3) forest areas that provide basic services of nature in critical situations (e.g. protection of water catchments and control of soil erosion).

Hibernaculum – A variety of shelters, such as a cave, where many kinds of animals such as bats, bears, and insects seek refuge or hibernate in the winter.

High-grading – Harvesting to extract only the most valuable trees from a forest. No consideration is given to regeneration requirements of tree species or future development and health of the trees or forest.

High-quality hardwoods – Hardwood trees or stands that will yield high-value timber products, such as face veneer, knot-free lumber, furniture, or specialty product stock and flooring.

Ingrowth – Trees that during a specified period have grown past an arbitrary lower limit, primarily of diameter or height. Ingrowth is usually expressed as basal area or volume per unit area.

Indicator species – A species whose presence in a certain location or situation at a given population level indicates a particular environmental condition. Population changes are believed to indicate effects of management activities on a number of other species or on water quality.

Invasive species -- Any kind of living organism (a plant like Japanese honeysuckle or a mammal like feral hog) that is not native to the area that spreads from a point of introduction to become naturalized and negatively impacts its new environment and/or causes economic harm.

Karst (topography) – Terrain with distinctive characteristics of relief and drainage arising primarily from a higher degree of rock solubility than is found elsewhere. Some examples are springs, losing streams, underground drainage and water reservoirs, caves, natural bridges, resurgences, and sinkholes.

Kerf (also Kirf) – The width of a cut a saw makes in cutting through wood; in usage, a thinner kerf on a saw blade dramatically increases the yield on a given log.

Landscape – A physiographic unit capable of sustaining several populations of a species; a mosaic of landforms and plant communities irrespective of ownership or other artificial boundaries.

Legacy tree (or forest) – Preserves certain qualities (such as old-growth trees or forests, wildlife habitat, species, community, etc.) that may be lacking on a landscape scale.

Log landing – A place where logs are taken (skidded) to be loaded on trucks for transport to the mill.

Losing stream – A flow stream that gradually gets smaller or disappears due to the loss of some or all of the flowage into below-ground channels or caverns.

MBF – Thousand board feet.

MDC – Missouri Department of Conservation.

MFPA – Missouri Forest Products Association.

Merchantable tree height – The height of a tree measured from a one foot stump height to a diameter at which the trunk is too small to be marketable. On Pioneer, hardwood sawlogs are measured to a 10" small-end diameter, and cedar and pine sawlogs are measured to a 6" small-end diameter.

MMBF – Million board feet.

Mature tree – A tree in which growth has reached the culmination of mean annual increment (economic maturity) and/or one in which growth equals loss of biomass, beyond which decline and mortality will eventually occur (biological maturity).

Mesic – (Of an environment or habitat) containing a moderate amount of moisture.

NA – Natural Area, representative of certain biologic or geologic characteristics with high natural qualities.

Native species – Flora or fauna naturally occurring in a particular area, and not introduced by humans.

Natural forest – A forested area with many of the principal characteristics of the native ecosystem.

Natural regeneration – An age class of trees created by natural seeding, sprouting, suckering, or layering.

Neotropical migrants – Bird species that breed in the United States during summer and spend winter in Mexico, Central America, South America, and the Caribbean Basin.

Non-timber forest products – All forest products except timber; other materials obtained from trees, such as resin, bark, and leaves, as well as other non-tree plant or animal products found in a forest.

NRCS – Natural Resources Conservation Service, part of the U.S. Department of Agriculture.

NSS – National Speleological Society, formed in 1941 to advance the exploration, conservation, study, and understanding of caves in the United States. (Volunteers from several of the NSS grottos, which generally function as the local chapter/club, work on L-A-D Foundation and Pioneer Forest property to document cave locations and provide mapping. The NSS has more than 250 grottos in the United States.)

Old-growth forest – Ecosystems distinguished by old trees and related structural attributes. Old-growth encompasses latter stages of stand development, which typically differ from earlier successional stages in ways that may include: tree size; accumulations of large, dead woody materials, especially on the forest floor; number of canopy layers; species composition; and ecosystem functions.

Old-growth stand – A stand of mature trees that is unroaded or lightly roaded, with little evidence of previous logging, usually ranging in size from 15 to 500 or more acres, and of sufficient size and configuration to maintain specific ecological functions.

Overstory – The uppermost layer of foliage that forms a forest canopy.

Plantation – A forested area that lacks most of the principal characteristics of native ecosystems because of human activities, such as planting, sowing, and intensive crop-like management and harvests.

Prescribed Fire – (Prescriptive fire management) The knowledgeable and controlled application of fire to a specific land area to accomplish preplanned resource objectives.

Progeny – Offspring from a parent; in this case, the offspring of tree species within the timber stand.

Regeneration – Seedlings and saplings existing in a stand. This is the process by which a forest is renewed, either artificially by direct seeding or planting, or naturally by self-sown seeds and sprouts.

Resurgence – According to karst terminology (A Glossary of Karst Terminology, W.H. Monroe, 1970, USDI, Geological Survey, Washington DC), this is the point at which an underground stream reaches the surface and becomes a surface stream. (The L-A-D Foundation's Ball Mill Resurgence functions most of the time as a sinkhole that collects and moves surface water to underground reservoirs, and then, during especially heavy rainfall, reverses this flow of water to act like a spring.)

Riparian area or zone – An area along the bank of a river, stream, lake, or pond identified by the presence of vegetation that requires free or unbound water or is more moist than normally found in the area. The zone may be a narrow strip of vegetation that borders a creek, river, or other body of water. Riparian zones may occupy only a small percentage of a watershed but are extremely important components of the general landscape.

Root-sprung – A condition of storm-damaged trees in which high winds bend a tree to the point where roots are partially pulled from the ground but the tree is not blown down.

Savanna – Grasslands interspersed with open-grown scattered trees or groupings of trees. They are strongly associated with prairies and are dominated by prairie grasses and forbs. Canopy cover is usually less than 30 percent, but greater than 10 percent.

Sawlog – A log of suitable size for sawing into lumber. Sometimes used as shorthand for referring to a “sawlog tree,” or a tree of suitable size for processing into lumber.

Scale – A measure of volume in a tree, based on the diameter and height of the tree.

Silviculture – The art and science of tending a forest by manipulating its establishment, composition, and growth to best fulfill the objectives of the owner, which may include the production of timber.

Single-tree selection – A harvest method expressed by the selection of individual trees to be removed from a stand of trees; the basis of uneven-aged management.

Skid trail – A road or trail over which equipment or horses drag logs from the stump to a road or log landing.

Snag – A standing dead tree from which leaves and most of the branches have fallen. A snag may be newly dead and appear to be a leafless tree or may be little more than a tall stump from which all of the limbs and bark have fallen. Snags are used by a variety of wildlife species.

Stave – Narrow length of wood with a slightly beveled edge forming the sides of barrels, tanks, and pipelines.

Stream – A channel with a defined bed and a bank that carries enough water flow at some time during the year to flush out leaves. (1) Ephemeral streams flow less than 10 percent of the time in direct response to rainfall, with a channel that may be scoured or unscoured and is always above the water table. (2) Intermittent streams flow seasonally (10 percent to 90 percent of the time) in response to a fluctuating water table, with a scoured channel at least three feet wide. (3) Perennial streams flow year-round (more than 90 percent of the time), with a scoured channel always below the water line.

Stumpage – The value of standing timber or uncut merchantable timber.

Suckering – The generation of sprouts that grow along the trunk of a tree, usually after a drastic change in growing conditions, such as a heavy harvest that allows a sudden increase of light to reach the trunk.

Sustainable forest management – The practice of meeting forest resource needs and values of the present without compromising the forest's value for future generations.

Talus – A slope formed by an accumulation of rock debris.

Threatened species – Any listed species likely to become endangered within the foreseeable future.

Timber stand improvement (TSI) – A thinning made in timber stands to improve the quality, composition, structure, condition, health, and growth of the remaining trees.

Topographic relief – The three-dimensional quality of the surface of land depicting the differences between the lowest and highest elevations within an area (topographic map showing contour intervals).

Topographic roughness – A measurement of the variability of the land surface in a particular area that takes into account slope, shape, and aspect within the landscape.

Tree taper – The degree to which a tree's stem or bole decreases in diameter as a function of height above ground.

Tufa – A natural, calcareous deposit associated with springs, lakes, and groundwater.

Understory – The area of the forest at the lowest height level below the forest canopy. Plants in the understory are a mix of saplings of canopy trees together with understory shrubs and trees. In the Ozarks, dogwoods, redbud, and bladdernut are rarely tall and are generally understory trees.

Uneven-Aged Silvicultural System – The application of a combination of actions that results in the creation of stands in which trees are in at least three age classes. Managed uneven-aged forests are characterized by a distribution of age classes and tree sizes ranging from regeneration to mature trees on each acre throughout the forested area. Regeneration in a particular stand is obtained throughout the harvest cycle and following a harvest and, in oak/hickory stands, is retained until a short time after complete canopy closure. Single-tree selection or small-group selection tree harvest methods are used to produce uneven-aged stands.

Vascular Plant – Plants with specialized tissue for circulating resources (water, minerals, and photosynthetic products), including ferns, club mosses, conifers, and flowering plants, which include deciduous trees.

Veneer – A thin slice of wood removed from a log. The thin slice is laminated onto a lower quality or more stable base and is often, but not necessarily, of the same species.

Veneer tree – A tree more than 18 inches in diameter, knot-free and high-quality with veneer logs.

Volume – The amount of wood in a tree, stand of trees, or log expressed in some unit of measure, such as board feet, cubic feet, etc.

Water bars – Used to prevent erosion on sloping trails or roads by reducing the velocity of water and the length of its flow; generally constructed at a diagonal across the path.

Watershed – Land with a single drainage network which may be very large, such as the Mississippi River watershed, or smaller, such as the Blair Creek watershed. A watershed may or may not include a perennial stream. Holmes Hollow in Shannon County does not include a perennial stream.

Wetlands – Those areas inundated by surface or ground water often enough to support plants and other aquatic life that require saturated or seasonally saturated soils for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas, such as sloughs, potholes, wet meadows, fens, river overflows, mud flats, and natural ponds.

Woody debris – All woody material, from whatever source, dead and lying on the forest floor.

Woodland – Generally defined as an area with less than 60% canopy cover, but greater than 30% canopy cover. They tend to have distinct layers: an open canopy, a sparse understory, and a dense groundcover of shrubs, forbs, grasses, and sedges.

Working forest – That portion of a forest dedicated to the production of forest products.





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The L-A-D Foundation has been based on the generous gifts of our founder, Leo Drey (1917 - 2015). Other individuals have given gifts of land, their time, and grants to assist us in our work with Ozark forests, protecting natural and cultural areas, and encouraging research, education, and programs that provide a positive influence in Missouri, especially the Ozark region. If you are interested in supporting our work, please contact us.

January 2021

Between 1996 and 2006, the staff of Pioneer Forest prepared an Annual Report for the Board of Directors of the L-A-D Foundation. Beginning in 2007, this report was expanded to become the Annual Report of the L-A-D Foundation.

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