



L-A-D FOUNDATION

Since 1962

2019 Annual Report

COVER PHOTO: Sunlight filters through shortleaf pines and oaks in Pioneer Forest's Pine-Oak Woodland Ecological Management Area in Shannon County.

Shortleaf pine is Missouri's only native pine species. Pine forests and woodlands once covered about 6.6 million acres of southern Missouri, particularly in the Ozarks highlands. Extensive logging from 1890 to 1920 reduced these pine forests to only about 500,000 acres on which pine occurs intermixed with oak and other hardwoods.

Many of L-A-D's lands, including Pioneer Forest, lie within shortleaf pine's historic range, and remnants of native pine still exist in these areas today. The cover of this year's annual report shows one part of a larger, historically important landscape along Highway 19 south of Round Spring. Red-cockaded woodpeckers were last seen here in 1946, centuries old pine still thrive, and pine-oak woodlands interspersed with glades are being restored.

In a year devoted to developing a new management plan for the forest and undertaking strategic planning for the L-A-D Foundation as a whole, the future of our pine has loomed large. It is a species that is predicted to fare relatively well under a warming climate and it is now approaching 30 percent of the standing volume of Pioneer Forest, but it presents challenges. One of the challenges is that pine relies on repeated disturbance, such as fire, to regenerate. Without fire, pines that remain on the forest will continue to grow larger, but few new pines will take root and develop to sustain the woodland into the future. Another challenge is that there is currently no high-value market for pine in Missouri. And a third is that it occurs scattered among valuable hardwoods such as oak, some species of which are susceptible to damage from fire.

Because Pioneer Forest is a working demonstration of renewable resource use from a diverse, uneven-aged, healthy forest, we are determined to address these challenges in a coordinated way through careful adaptive management, research and monitoring, and collaboration with our partners.

For more on our efforts to plan for and meet the challenges of Missouri's pine-oak landscapes, see pages 5-6, 8, 18-19, 24, 28, 35, and 39.



Prescribed fire at the Pine-Oak Woodland EMA, 2014



Prescribed fire at the Pine-Oak Woodland EMA, 2019

The careful application of prescribed fire helps to reinvigorate pine regeneration and is essential in maintaining pine and pine-oak landscapes. The L-A-D Foundation uses several methods to keep fires relatively cool so as not to damage existing mature trees, whose root systems have slowly made their way into the duff layer during the many years fire was absent from the landscape. Conducting burns at night when temperatures are lower and humidity is higher (above left) is one such technique. Carefully applying fire around the base of individual trees (above right) can also help protect trees from the heat of headfires by reducing surface fuels in advance. The results are a more open woodland landscape with diverse and abundant native flora and habitat-dependent bird species. Photos: NEAL HUMKE

COVER PHOTO: NEAL HUMKE, 2017

ANNUAL REPORT

of the L-A-D Foundation

January 2020

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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 founded 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, as a limited liability corporation, to the L-A-D Foundation to be managed as an exemplary model of uneven-aged conservative single-tree selection forestry.

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From the President

For most of us here at the L-A-D Foundation and Pioneer Forest, 2019 has been a year of introspection and forward thinking, a year of planning.

In our last annual report, we addressed the history and key measures of our Continuous Forest Inventory, which has been conducted every fifth year since 1952 and provides the basis for planning the management of the forest. The 2017-2018 inventory, using new laser equipment, confirmed that we have substantially more merchantable volume on the forest than previously measured, prompting the staff to dig more deeply into the data this year.

What they found, after considerable analysis and discussion with forestry experts, is that much of the forest is now likely at an historic juncture we knew would be coming at some point. After more than six decades of restoring formerly degraded land, much of the forest is now fully stocked, and we are faced with the new challenge of maintaining a mature uneven-aged forest in perpetuity. The data show that regeneration of certain key species has been declining in recent years, likely a result of inadequate light penetrating the canopy to the forest floor. In addition to addressing silvicultural challenges, the new plan includes greater integration of stewardship practices on special areas within the forest. All this and much more is considered in the 137-page management plan for the forest, approved by the board in October.

Even as we were finalizing the new forest management plan, we also began a strategic planning process for the foundation as a whole to consider the entire range of our programs and organizational structure, including a highly productive three-day retreat for the board with key staff and advisors in August. Although that process is ongoing, we have agreed on four major strategic goals with initiatives and action items in the areas of maintaining a healthy forest, demonstrating exemplary stewardship on all our lands, increasing the foundation's outreach and influence, and sustaining an organizational structure appropriate to our charitable mission. We have already begun implementing some aspects of the plan and will report more fully next year.

Beyond the emphasis on planning, this has been a year highlighted by major honors for several current or former members of our board and staff. John Karel, our longtime former president, was inducted into the Missouri Recreation and Parks Hall of Fame in February, and in April Clint Trammel, the longest-serving manager of Pioneer Forest, was inducted into the Missouri Conservation Hall of Fame. At our Ball Mill Natural Area, we hosted a celebration of our former director Jerry Vineyard's many contributions to Missouri geology. In November, our founders Leo and Kay Drey and board member Steve Mahfood were honored by the Missouri Coalition for the Environment with its first Lifetime Achievement Awards, and the Missouri Historical Society presented our longtime treasurer Wayne Goode with its highest honor, the Thomas Jefferson Award. L-A-D has benefited greatly from the service of such remarkable individuals over the years, and we extend our heartfelt congratulations.

2019 has also seen many transitions. In July we were deeply saddened by the passing of Leon Cambre, who served on our board since 1997; we will miss his sage advice and friendship. We welcomed two new foresters to the staff this year, Levi Bachmann and Clay Jensen, cheered the return of Matt Skaggs, and greatly appreciate the many skills Nancy Thompson now brings to our St. Louis office. And in October, after admiring his guidance of our strategic planning retreat, we were pleased to welcome Roger Still to our board. We look forward to working in 2020 with our staff, board, and many partners.

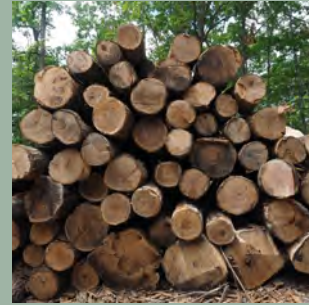


Susan Flader
President, L-A-D Foundation

L-A-D FOUNDATION

PIONEER FOREST MANAGEMENT
LAND CONSOLIDATION
RESEARCH AND MONITORING
STEWARDSHIP AND RECREATION
OUTREACH AND EDUCATION
GRANTMAKING AND COMMUNITY SUPPORT
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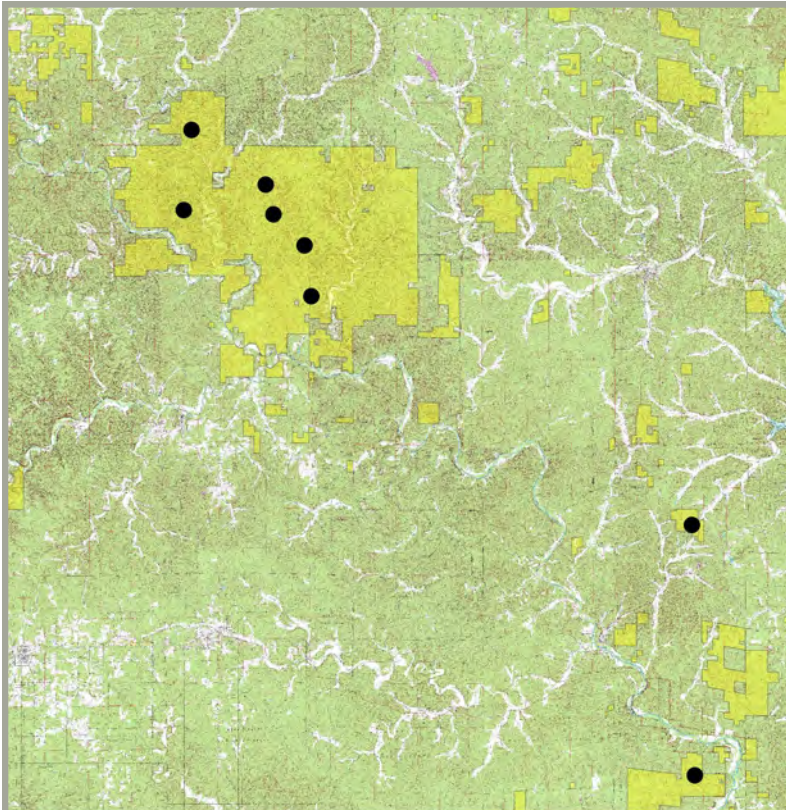
Pioneer Forest Management



Timber at a log landing.
HERMANN RODENKIRCHEN

Preliminary results from Pioneer's 2017 Continuous Forest Inventory (CFI) were reported in the foundation's 2018 Annual Report. Over the past year, staff, board, and advisory council members have further analyzed and discussed the data. The planning that resulted has been collected in a forward-looking, recently-completed 2019 Pioneer Forest Management Plan. The plan recognizes there may be problems in certain areas of the forest where the timing of timber harvest has not followed the preferred harvest schedule, the result being a closed canopy and reduced regeneration. The new plan, which addresses this issue and others, is discussed below, along with other aspects of forest stewardship that staff have undertaken in 2019.

TIMBER SALES



Locations of 2019 timber sales on Pioneer Forest.
Map: DUSTIN COLLIER

Pioneer Forest had seven active timber sales during most of 2019. Timber harvest is up some from last year with 8 million board feet of sawtimber, 3.6 million board feet of blocking, and more than 591,000 board feet of white oak staves being sold. Timber sales of marked live trees covered 5,600 acres, just exceeding the minimum acreage established as a goal. With a new forester joining the staff in January, it should be possible to harvest more acres in 2020.



Timber harvest loaded for transport.
HERMANN RODENKIRCHEN

PIONEER FOREST MANAGEMENT PLAN APPROVED

The 2017 CFI was the first to use new laser clinometer technology capable of more accurately measuring the merchantable height of trees. The resulting data showed that Pioneer Forest has considerably more timber volume per acre than previously recorded and showed that tree growth rates on Pioneer continue to remain strong. The average basal area per acre (a measurement of the total area of the cross section of trees on a given acre) has risen steadily across the forest to a new record high of 73 square feet per acre. Past research has shown that increasing basal area of overstory trees and resulting canopy cover reduces tree reproduction. Results from the most recent CFI show that while our large overstory trees have been getting bigger the number of stems per acre of advance reproduction has fallen from 75 per acre in 1997 to only 30 per acre in 2017. The reason for this drop in tree reproduction is likely because the canopies of older, larger trees are shading out younger trees vying for sunlight. With the goal of Pioneer Forest being to maintain an uneven-aged character across the forest, this shift towards lower reproduction rates presents a challenge.



Armed with this data, Pioneer Forest staff began crafting a new management plan for the forest in 2019. The development of the 2019 Pioneer Forest Management Plan involved extensive review by the foundation's stewardship committee and by individual board and advisory council members. At its October 7 meeting, the Board of Directors gave final approval.

The new plan replaces the previous 2011 plan as the core planning document for forest staff and guides management decisions for the forest. Twelve major management actions are planned:

- Harvest between 5,500 and 7,000 acres annually to maintain a 20-year cutting cycle.
- Increase the volume of timber harvested per acre with monitoring of stand structure and regeneration before and after cut, and seek independent research to assess the effect on the uneven-aged character of the forest.
- Extend use of prescribed fire to enhance regeneration of shortleaf pine on appropriate sites (e.g., Himont), and monitor results and implications for management.
- Maintain 577 miles of property line by re-painting approximately 115 miles of property line annually except during inventory years.
- Re-measure the CFI beginning in the fall of 2022, and assess implications for management.
- Continue to protect all natural areas and forest reserves, review lands to identify other potential natural areas and forest reserves, and add new areas where appropriate.
- Continue stewardship of designated ecological management areas.
- Maintain the existing recreational trail system through the forest in good condition.
- Limit public motorized vehicular access on our private forest roads.
- Limit the spread of exotic invasive species.
- Work to eradicate feral hogs from Pioneer Forest and cooperate with the Missouri Feral Hog Partnership and owners of surrounding lands.
- Continue to consolidate the boundaries of the forest through acquisition of interior and adjacent tracts and sale or trade of inefficient outlying parcels.

Continued on next page



The first goal of cutting as much as 7,000 acres annually is necessary in order to get back to a 20-year cutting cycle and address the reproduction challenge facing Pioneer Forest. It also will be necessary to cut a greater number and volume of trees per acre in each harvest, including older, larger trees, so that more sunlight can reach the forest floor to allow seedlings and young understory trees to thrive. Such changes will require careful monitoring of each harvest site before and after cutting and research to assess the impact on stand structure and the uneven-aged character of the forest in order to make appropriate adjustments over time.



Shortleaf pine as of the 2017 CFI accounts for 29 percent of the standing volume of the forest. Pine, unlike most hardwoods, requires disturbance such as fire establish. Most of Pioneer's pine is mature and large, with very little regeneration, and pine in the Missouri Ozarks typically grows in association with oaks and other hardwoods, presenting both management and harvest challenges. We plan careful experimentation with prescribed fire at appropriate sites, such as a 388-acre area at Himont, to secure pine regeneration, and collaboration with partner agencies and organizations on management-oriented research and on development of higher-value markets for Missouri pine.



The 2019 plan also increases our focus on other aspects of forest stewardship. For example, the plan establishes three new forest reserves totaling 629 acres and three new ecological management areas totaling 418 acres. The recreation and trails section calls for a second trailhead near the intersection of Camp Zoe Road and Lizzie Heaton Ridge. Two new trails will be designed and constructed, one crossing Big Creek and connecting with the existing Trails of the Roger Pryor Pioneer Backcountry, and a second loop trail at Sugar Tree Hollow leading from Echo Bluff State Park into the Backcountry.

Staff continually add information regarding our various GIS data layers and seek out additional data that improve mapping projects and inform management. The 2019 plan for the first time includes 37 township maps that cover the entire forest. These maps use a newer seamless topographic basemap with shaded relief and display fee-title boundary lines for adjacent conservation-managed lands, including those owned by Missouri State Parks, Department of Conservation, Mark Twain National Forest, Ozark National Scenic Riverways, and The Nature Conservancy.

Top: CFI witness tree in a fully-stocked tract on Pioneer Forest. JIM GULDIN
Middle: Native flowers and shortleaf pine regeneration in an open area of the Pine-Oak Woodland Ecological Management Area. GREG IFFRIG
Bottom: Glade coneflowers at the Tall Larkspur Ecological Management Area. NEAL HUMKE

Other sections of the plan describe the origins and methods of management on Pioneer Forest, conservation of biological diversity, climate change, exotic invasive species, management of cave and karst resources, outreach and education, and state, county, and private woods roads. This document will be reviewed in five years, along with the results from the upcoming 2022 continuous forest inventory, and amendments will be considered as needed.

BOUNDARY LINES

Maintaining Pioneer Forest's 577 miles of boundary line is a top priority for Pioneer staff. The goal is to repaint each mile of Pioneer's boundary and re-establish corners during a six-year period. During the winter of 2018-2019 staff repainted the final 124 miles of boundary line, completing this project that began in 2013. During this past period, staff made a concerted effort to record dates and locations of each line painted, discovering in the process that some lines had likely not been painted in some time and were difficult to find. The new records and fresh paint should alleviate this problem in the future. As they repaint roughly 120 miles of lines during the winter of 2019-2020, staff are finding the job less arduous this time around.



Freshly painted tree. BRANDON KUHN

KELLOGG TRACT CLEANUP

The 790-acre addition to Pioneer Forest's Lily Pond Tract known as the Kellogg tract was purchased in 2014. The Kellogg tract was offered to Pioneer Forest by our neighbor and added valuable timber land adjacent to an already sizeable tract centered around the Lily Pond Natural Area.

The Kellogg land is located 1.5 miles northwest of Redford in Reynolds County. In addition to an old house site, several historic dumping sites were present on the property. In October 2019, Pioneer staff worked with a local contractor and a skid steer to remove more than 11 tons of household trash and debris and 113 tires, and fill in a potentially dangerous open cistern at the old house site. This work was in a visible area along a county road. We hope the cleanup signals our intentions as stewards of the land and discourages dumping by people who may have frequented the site in the past.



Above: Pioneer Forest staff clean up the Kellogg Tract. Left to right: Neal Christensen, Matt Skaggs, Levi Bachmann, and Dustin Collier.

Left: Eleven tons of debris was removed from the site.

PHOTOS: BRANDON KUHN

PROFILE: FISKE LOGGING

The quality of Pioneer Forest lands depends on the careful work of local logging crews. Gene Fiske Jr. and Gene Fiske Sr. have worked on Pioneer Forest since 2010. Their original company included Jay Duncan and operated under the name J&G Logging. A few years later Jay left the crew to start his own trucking business, and Tommy Fiske joined the crew in 2013. With Tommy on board, the business was renamed Fiske Logging.

The Fiskes, who specialize in harvesting pine, were the first crew to perform a sawtimber harvest on Pioneer's Randolph Tract in 2010. Today, a portion of this tract is known as the Pine-Oak Woodland Ecological Management Area. Foresters from both Pioneer Forest and the Missouri Department of Conservation recognized the quality of their work. J&G Logging won the Missouri State Logger of the Year Award in 2011 and were among the finalists for Regional Logger of the Year in the Midwest Region.

The Fiskes appreciate the conservative style of uneven-aged forest management on Pioneer. They see working for Pioneer Forest more as "a career rather than a short-term job sold to the highest bidder." Gene and Tommy are third generation loggers. They each have sons who may follow in their footsteps and become the fourth generation of Fiskes to log in the Missouri Ozarks.

When asked what their favorite memory was about working for Pioneer Forest, they responded with:

"Our favorite memory of working on Pioneer Forest would have to come from the Randolph Tract. We had 20-30 single logs on deck when we started the morning...roughly 1/3 of a load. We were going to haul two loads that day and in a deep dark holler we cut four trees a piece that finished the two loads. Each load weighed over 30 tons."

Brandon Kuhn, Pioneer's chief forester, has been working with the Fiskes since day one. He appreciates how easy the crew is to work with and that they are always willing to do what is asked of them. They maintain a high level of respect and are always courteous to Pioneer staff and visitors.

We thank the Fiskes and all the dedicated loggers who make responsible management of Pioneer Forest's resources possible.



Top: Gene Fiske Jr. (left) and Tommy Fiske (right). EASTON FISKE
Middle: Gene Fiske Sr. (center), Gene Fiske Jr. (second from right), and Jay Duncan (second from left) presented with MDC's logger of the year award. MDC
Bottom: Pine regeneration on the Randolph tract after thinning and prescribed burning, 2017. NEAL HUMKE

STATE CHAMPION BUTTERNUT ON PIONEER FOREST

While marking timber during the summer of 2018, Forest Manager Jason Green identified a very large butternut (*Juglans cinerea*). After checking the list of State Champion Trees with the Missouri Department of Conservation (MDC), he determined that this tree could be a contender as a state champion. Later, Pioneer foresters Dustin Collier and Levi Bachmann measured the tree and submitted the information to MDC. The measurements — 78 inches circumference at breast height, a total height of 78 feet, and one-fourth of the average crown spread calculated as 47 feet — were verified by MDC foresters Gary Gognat and Erin Napoli, resulting in 168 total points for the Pioneer tree. The current State Champion Butternut at Woodson K. Woods Conservation Area scores 164. Since each tree is within five points of the other, they are considered co-champions for the species.

Butternut is also commonly referred to as white walnut. Traditionally the hulls of its nuts and its bark were used to dye fabric. The species is scattered but declining throughout its range as a result of butternut canker. Many butternuts suffer from butternut canker and never attain the size of this individual tree. It is a testament to the protection of resources by Pioneer Forest.

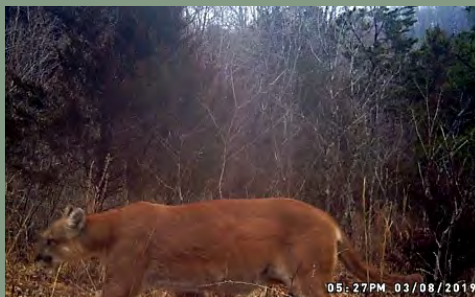


Above: Forest Manager Jason Green with the newly-crowned state co-champion butternut tree on Pioneer Forest. JOHN KAREL

Top Right: Butternut leaves. MISSOURI DEPARTMENT OF CONSERVATION

Bottom Right: Butternut seeds. MISSOURI DEPARTMENT OF CONSERVATION

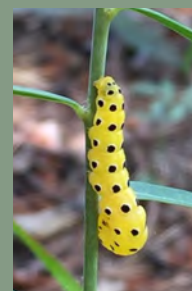
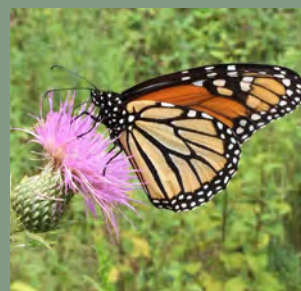
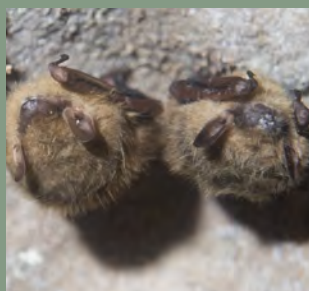
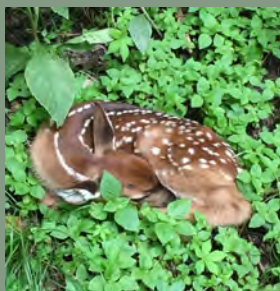
WILDLIFE ON PIONEER FOREST



Situated within the more than 140,000 acres of Pioneer Forest, the 62,000-acre Roger Pryor Pioneer Backcountry is the largest contiguous block of land under any ownership, public or private, in the state of Missouri. This undeveloped, remote Ozark setting is ideal habitat for a variety of wildlife, including species once extirpated from the state. Mountain lions have been reported in the area, and earlier this year one was photographed near the boundary of Pioneer Forest. Black bears have long been studied on Pioneer Forest, especially within the Backcountry. Other threatened or endangered species make their home on Pioneer, and the forest provides unbroken corridor for migratory birds. Game animals, such as deer and turkey, also thrive in this largely undisturbed environment, and the entire area is part of MDC's Elk Restoration Zone.

Visitors to the Backcountry should be aware of the potential for wildlife encounters. Although there have never been any reported incidents on Pioneer lands, we urge caution when hiking or camping in this remote setting. Visitors should maintain awareness of their surroundings and keep their distance from wildlife. Never feed wild animals – this encourages them to seek out areas with humans, which can lead to problematic encounters.

For more on how Pioneer's forest management provides for species habitat, additional information can be found at <https://ladfoundation.org/pioneer-forest/biological-benefits/>.



TOP OF PAGE. Left: *Black bear print*. NEAL HUMKE; Center: *Mountain lion near Leatherwood Creek*. DUSTIN SMITH; Right: *Pygmy rattlesnake on Jerktail Mountain*. NEAL HUMKE

BOTTOM OF PAGE. Top left: *Fawn in Pine-Oak Ecological Management Area*. NEAL HUMKE; Top second left: *Two Indiana bats*. DAN LAMPING; Top second right: *Monarch butterfly on thistle*. NEAL HUMKE; Top right: *Schinia moth caterpillar*. NEAL HUMKE; Bottom left: *Flying squirrel*. NEAL HUMKE; Bottom second left: *Turkey eggs*. NEAL HUMKE; Bottom second right: *Wild turkey*. JASON GREEN; Bottom right: *Cave salamander*. DAN LAMPING

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Land Consolidation



Woolly lip fern on Wildcat Mountain. GREG IFFRIG

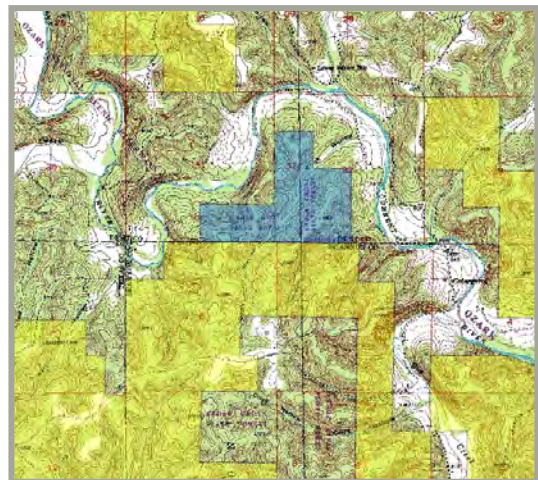
Each year we work to improve our overall property boundaries. These efforts look at efficiencies of management, location, and land characteristics in identifying future lands for purchase, and also identify small inefficient outlying tracts to sell. Reducing boundary line mileage, improving protections for our existing larger tracts of forest land, and ensuring future access for logging and stewardship are high priorities. For our natural areas, we seek opportunities to protect watersheds, especially the upper end of a watershed, which ensures that the valuable resources originally acquired may be sustained and enhanced. In karst areas like Perry County, where we have been acquiring buffer lands near our highly significant Ball Mill Resurgence Natural Area, underground recharge areas are the key to protecting water quality.

Our planning process includes creating topographic maps that display forest cover, natural features such as glades, and the relationship of our property to other private and public holdings. These maps allow staff and board members to envision our overarching land consolidation goals for Pioneer Forest and our outlying natural areas. Such long-range planning has enabled us to take advantage of opportunities to protect creeks and streams on the forest and fill in gaps between our forest lands and state and federal ownerships.

Each of this year's efforts is an excellent example of such projects. As we go into 2020, we also look back over ten years at some of the most important additions to Pioneer Forest and to several of the foundation's natural areas.

CONSOLIDATION ON THE UPPER CURRENT RIVER

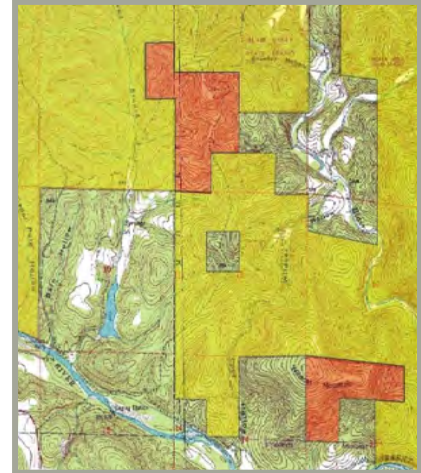
In March we acquired 280 acres (blue on the map) in Dent County, adding to a now 4,060-acre tract of land (yellow on the map) just upstream of the popular landing at Cedar Grove. Remaining within that large tract of land is 560 acres of Conservation Department land and another 60 acres that are privately owned. Historically, access to the new parcel has been from Route B by crossing our land using a Pioneer woods road. This acquisition enhances our ability to control trespass and prevents new construction of a single-family dwelling allowed by an existing easement. With this addition, Pioneer land on the west side of the Current River serves as a three-mile long, undeveloped forested gateway along Route B and further protects the Ozark National Scenic Riverways.



ACQUIRING LAND ON WILDCAT MOUNTAIN

This past year, Pioneer Forest acquired two tracts of land within the Roger Pryor Pioneer Backcountry from one of our neighbors, adding 260 acres between Blair Creek and Matthews Branch and 160 acres on the southeast flank of Wildcat Mountain.

Wildcat Mountain is one of the Eminence Igneous Glade/Oak Forest Knobs described in the Current River Hills Section of the *Atlas of Missouri Ecoregions* (Nigh and Schroeder, 2002). This landscape is characterized by glade openings surrounded by woodlands. Native grasses, winged elm, and thick patches of wooly lip fern (*Myriopteris lanosa*) grow atop igneous rock throughout these glades. Over time, natural openings on south and west-facing hillsides have been decreasing in size as surrounding woodlands start to encroach into glade areas. Prescribed fire is needed to keep glades clear of aggressive woody plants and trees, such as eastern red cedar. Consolidating our ownership in this area will allow for concerted management of these unique resources.

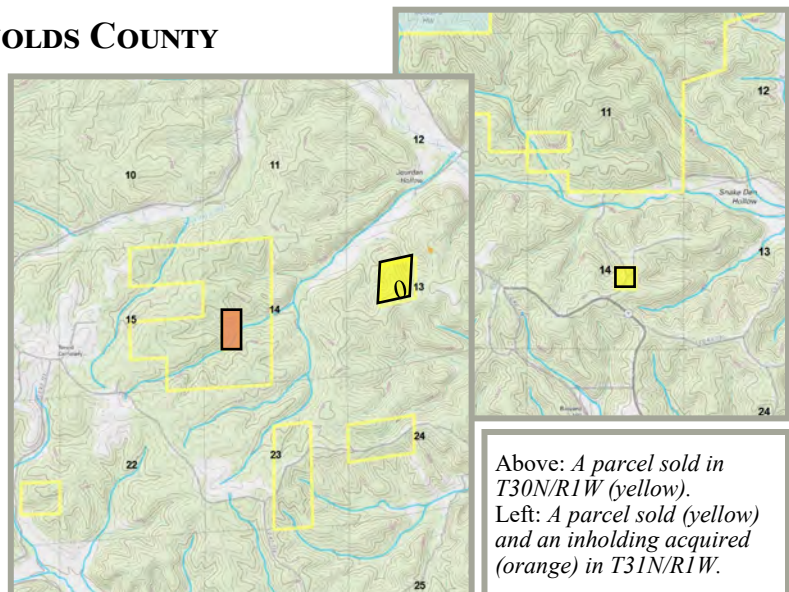


Jerktail Mountain, where we acquired an important tract adjoining Ozark National Scenic Riverways in 2011, is another example of these Eminence Igneous Glade/Oak Forest Knobs found on Pioneer Forest. These exposed igneous rocks in Shannon County constitute a special region of the Current River Hills, similar to Mill Mountain and Stegall Mountain of the St. Francois Knobs and Basins region in Madison, Reynolds, and St. Francois Counties. These weather-resistant mountains are prominent features of the landscape in both areas.

Left: A glade view from the top of Wildcat Mountain.
GREG IFFRIG

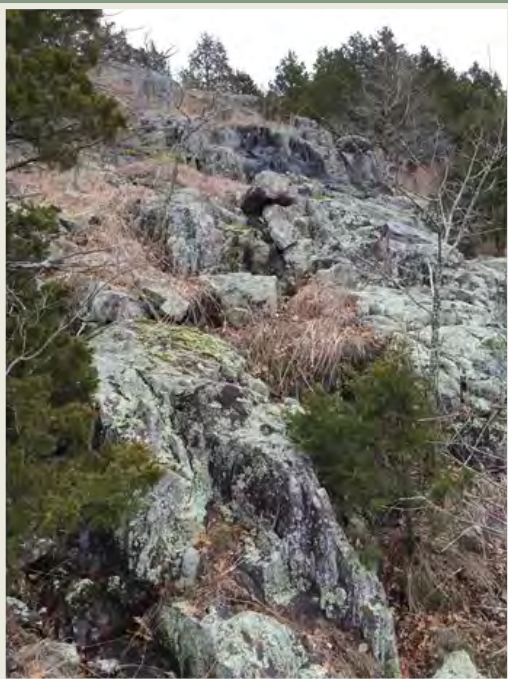
OTHER TRANSACTIONS, REYNOLDS COUNTY

Several transactions were completed late in the year to consolidate Pioneer land in Reynolds County. Pioneer acquired a 20-acre inholding and in exchange sold two outlying tracts totaling 50 acres. Together these transactions resolve the inefficiencies of maintaining property lines and managing multiple small tracts, and the exchange provides additional funds for a future acquisition. Over time, these types of transactions will concentrate management efforts across a more consolidated Pioneer Forest with fewer but larger individual tracts.



Above: A parcel sold in T30N/R1W (yellow).
Left: A parcel sold (yellow) and an inholding acquired (orange) in T31N/R1W.

LOOKING BACK — THE PAST 10 YEARS OF LAND CONSOLIDATION



Guided by a consolidation plan that is focused on enhancing protection of the foundation's existing lands, the L-A-D Foundation has made significant progress in acquiring properties important to its long-range management of Pioneer Forest and its Missouri Natural Areas.

Over the past ten years, we have added 2,177.5 acres to Pioneer Forest, spending \$1.8 million on land in Dent, Reynolds, and Shannon Counties. We completed important acquisitions at Ball Mill Resurgence Natural Area / Blue Spring Branch Conservation Area in Perry County and at Hickory Canyons Natural Area in Ste. Genevieve County, totaling 300 acres at a cost of \$915,000.

Highlights include:

- Key acquisitions of ecologically significant areas on Pioneer Forest at Jerktail and Wildcat Mountains within the Roger Pryor Pioneer Backcountry in Shannon County.
- Three additions to Ball Mill Resurgence Natural Area and the adjoining Blue Spring Branch Conservation Area on the Perry County Karst Plain, including frontage along Blue Spring Branch.
- Three additions at Hickory Canyons Natural Area in Ste. Genevieve County.
- Acquisition of inholdings on Pioneer Forest, reducing boundary line, securing access, and improving overall management potential.

Top left: *The Benne property, an addition to Hickory Canyons Natural Area acquired in 2013 with the assistance of grant funding.* GREG IFFRIG

Bottom left: *Jerktail Mountain inholding in Shannon County acquired in 2011.* NEAL HUMKE

10 YEARS OF LAND CONSOLIDATION



Top left: *Federally endangered grotto sculpin whose habitat occurs beneath foundation lands in Perry County. MDC*

Top right: *Stream on an addition to Hickory Canyons Natural Area acquired in 2016. GREG IFFRIG*

Middle left: *Woodlands on the Kellogg tract, an addition to Pioneer Forest in 2014. JASON GREEN*

Middle right: *Missouri Natural Areas Committee inspecting an addition to Hickory Canyons Natural Area in Ste. Genevieve County, acquired by L-A-D in 2014. GREG IFFRIG*

Bottom left: *Bottomland field on an addition to Pioneer Forest near Sunklands Natural Area, acquired 2016. BRANDON KUHN*

Bottom right: *A igneous glade on Wildcat Mountain, acquired 2019. GREG IFFRIG*

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Research and Monitoring



Hog sign identified during an MDC survey of fens on Pioneer.
NEAL HUMKE

The L-A-D Foundation has always encouraged research on lands we own and manage. The board and staff planning exercise this past year prioritized certain research projects of strategic interest for our continuing stewardship activities.

For 2019 we report on several projects that have helped focus future work. The research on fire effects in tall larkspur and savanna blazing star habitat discussed here is being conducted in partnership with the National Park Service Ozark Highlands Group in Van Buren. The results have helped us understand the importance of our own future work to prioritize glade restoration across our lands. We are learning more about the significance of Pioneer Forest fens through our partnership with the Missouri Department of Conservation. Better understanding of these unique areas will help guide future management of the forest. Finally, the foundation contracted with Winrock International to conduct the first ever study of carbon sequestration on Pioneer Forest. That recently completed study, which confirms our assumptions about how our methods of forest management allow for greater sequestration of carbon, may be important for those who are considering adopting similar uneven-aged management techniques.

CAVE RESEARCH ON PIONEER FOREST



CRF members repair the Holmes Hollow Cave gate.
NEAL HUMKE

In January during a bat monitoring trip, Cave Research Foundation (CRF) observed that both Cookstove and Holmes Caves gates had been breached. Both gates were repaired by CRF and L-A-D/Pioneer Forest crews, requiring welding with reinforcements placed at the base of each gate to discourage future attempts to dig underneath.

In February monitoring trips were also conducted to Big and Little Bear Caves and to the Chalk Bluff area to map a cave that had been found shortly after graffiti-cleanup activities in 2015. In March, CRF cavers and members of the Meramec Valley Grotto camped at Himont Trailhead and searched for a large cave reported a few years ago, but nothing was found. Two known caves were visited as well as a large spring complex that may lead to a cave. In December, CRF visited Medlock Cave and confirmed that the gray bat population was doing well.

TALL LARKSPUR AND SAVANNA BLAZING STAR



Tall larkspur (*Delphinium exaltatum*) was discovered on the Ozark National Scenic Riverways (ONSR) in the early 1990s. Other populations were discovered in 2010 in the Devils Well and Welch Spring Lodge areas on Pioneer Forest.

These discoveries in the Ozarks are significant given that they represent an entire sub-population of a species that otherwise is more than 400 miles away in eastern Tennessee.

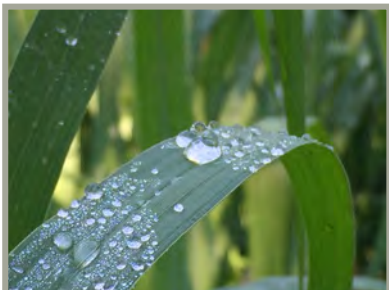
Habitat restoration began in 2011 on the Ozark National Scenic Riverways. In 2012 Pioneer Forest partnered with ONSR to expand the Welch Lodge prescribed burn unit to incorporate a Pioneer Forest tall larkspur population.

Preferred habitat conditions for tall larkspur are the lower edge of glades and adjacent open woodland. Monitoring of two permanent plots in the Welch Lodge prescribed burn unit showed that tall larkspur increased by 511 percent (from 293 stems in 2011 to 1,789 in 2016) after burns in 2012 and 2016. Monitoring of another permanent plot in the Devils Well burn unit showed that tall larkspur increased by 1,064 percent (from 129 stems in 2011 to 1,501 in 2019) after burns in 2012, 2016, and 2019. Monitoring of one permanent unburned control plot near Round Spring showed that tall larkspur decreased by 41 percent (from 138 stems in 2011 to 81 in 2019). Given these results, the foundation plans to continue managing tall larkspur areas with prescribed fire in partnership with the National Park Service.



In 2019 the state-listed savanna blazing star (*Liatris scariosa* var. *neiuwlandii*) was mapped and inventoried in the Devils Well prescribed burn unit with a small population of 29 plants on Pioneer Forest land and a larger population of 172 on National Park Service (NPS) land, the third largest population recorded in Missouri.

Additional populations of savanna blazing star were discovered in 2019 near glades on L-A-D Foundation land just north of Cave Spring in both Grassy and Parker Hollow. This area is rich in remnant plants from the historic Salem Prairie such as lead plant, prairie willow, prairie phlox, Bush's skullcap, eastern gama grass, royal catchfly, and rattlesnake master. L-A-D will continue to monitor these plant populations and work with our partners using prescribed fire to improve their habitat and ensure their continued presence.



Top: Tall larkspur. NEAL HUMKE
Second from top: NPS monitors tall larkspur. NEAL HUMKE
Second from bottom: Savanna blazing star. US FOREST SERVICE
Far left: Dew on eastern gama grass. NEAL HUMKE
Left: Prairie phlox. NEAL HUMKE

FEN ELEMENT OCCURRENCE UPDATES ON PIONEER FOREST

The Missouri Department of Conservation (MDC) contracted botanist Chris Benda to revisit and document the current condition of fens beyond MDC ownership. Many of these sites were initially documented as rare natural community types or element occurrences in the late 1980s but had not been officially re-surveyed since. Five fens on Pioneer Forest land were included in this project: Fishtrap Hollow, Marshy Hollow, Sutton Schoolhouse Hollow, Old Schoolhouse Hollow, and Thompson Hollow. The final report is due in the coming season.

Susan Farrington, MDC Natural History Biologist, and L-A-D Land Stewardship Coordinator Neal Humke surveyed Rough Hollow Fen and the lower Leatherwood Creek area to update known fen occurrences and document new ones. Rough Hollow Fen within the Leatherwood Creek area is the largest fen on Pioneer Forest.

While fens on Pioneer Forest still contain a diverse array of unique plant species, they are threatened by feral hog rooting activity, exotic invasive plant species, unauthorized motor vehicle use, and changes in hydrology such as scouring or inundation by flood waters. In response to these threats, the 2019 Pioneer Forest Management Plan highlights the greater need for feral hog eradication and establishes two new ecological management areas to ensure fen areas can be managed in site-appropriate ways into the future.



Top: Researchers at Fishtrap Hollow Fen.

Second from top: Turtle shell at Old Schoolhouse Hollow Fen.

Far left: Small waterfall at Old Schoolhouse Hollow Fen.

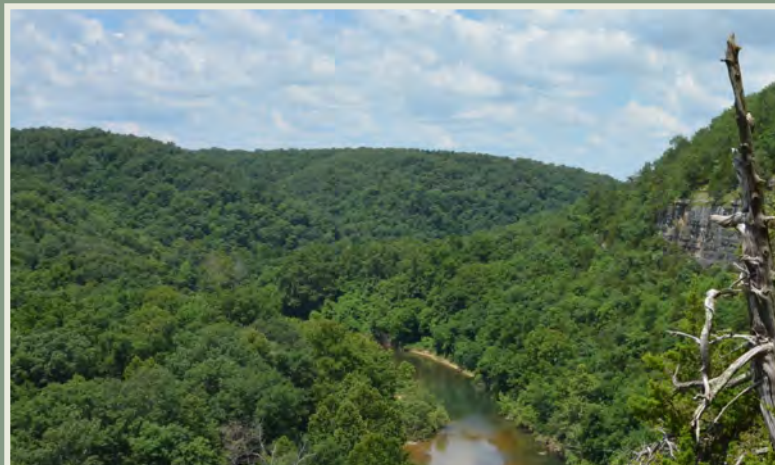
Left: Small waterfall at Marshy Hollow Fen.

PHOTOS: NEAL HUMKE

FORESTS AND CARBON

Forested landscapes like Pioneer constitute a large portion of carbon sequestration globally. With climate change becoming an increasing focus worldwide, understanding how uneven-aged forests like Pioneer impact carbon sequestration is a matter of growing importance. This year, the L-A-D Foundation contracted its first ever carbon study of Pioneer Forest. See report on the next page.

DENISE HENDERSON VAUGHN



ACCOUNTING FOR CARBON

Mature, stable forests like Pioneer (which is managed to maintain its natural character, health, and biodiversity) make an under-appreciated contribution to resilience during a time of climate change. Media attention is more often focused on deforestation and reforestation, leaving the maintenance of healthy, mature forests to be taken for granted.

Yet stable forestlands sequester carbon dioxide in larger quantities and for longer periods of time than most other land uses. Living trees remove carbon dioxide from the atmosphere through the process of photosynthesis and store it in their trunks, branches, and foliage, making up a large portion of total global carbon storage. If all those forests burned, the carbon dioxide released would be the equivalent of seventy years' worth of current global greenhouse gas emissions. And that's even before considering the additional carbon trees store below ground in their roots and in soils.

Carbon dioxide flows between stable mature forests and the atmosphere had once been thought to be in equilibrium, with a rough balance between emissions from natural tree deaths and sequestration through re-growth. But recent research finds that mature forests are in fact removing carbon from the atmosphere in substantial quantities.

Given this, the L-A-D Foundation wanted to know the amount of carbon sequestered by Pioneer Forest and to understand the impact of Pioneer's uneven-aged forest management on carbon sequestration compared with other forests in the region. It contracted with Winrock International—a leader in U.S. and international development, climate change mitigation activities and standards, and carbon stock assessments—for a preliminary assessment of Pioneer's carbon stocks and the impact of the forest's management practices on greenhouse gas emissions. Fortunately, Pioneer's 2017 Continuous Forest Inventory remeasurement was nearing completion, and the data from the current and three previous CFIs, along with other GIS data, was determined by Winrock to be suitable for use in the study.

The study showed, as anticipated, that carbon stocks in trees across Pioneer Forest had increased steadily; they were estimated at 23 tons of carbon per acre as of the 2002 CFI and 26.5 tons of carbon per acre in 2017. Complex equations were used to account for biomass differences between species and between different parts of a tree. Equations were specific to merchantable biomass and did not include carbon stored in the ground.

The Winrock study also demonstrated that carbon stocks on Pioneer Forest are substantially higher than common practice stocks for this forest type (oak-hickory-pine) and geographic area as estimated by the Climate Action Reserve. There is still much to learn when it comes to understanding and detecting changes in carbon dioxide sequestration and carbon accounting for Pioneer and similar forests. Changes tend to be relatively small and spread over large areas.

Takeaways from the study are that Pioneer should continue its uneven-aged management practices and its efforts to secure adequate regeneration and to anticipate, detect, and protect the forest from emerging climate-related threats such as invasives, pests, disease, wildfire, drought, windthrow, and airborne pollution. As recommended by Winrock, we will begin accounting for carbon during each CFI measurement of the forest. As a demonstration forest, this carbon accounting is another quantitative assessment of the benefits from our management beyond timber, biodiversity, and natural communities. Further, as we learned from the report and discussions with Winrock staff, most of the yield tables and equations for assessing carbon stocks have been developed for even-aged forests, not uneven-aged forests like Pioneer, so carbon accounting on Pioneer presents an opportunity to contribute to much-needed research on the impact of uneven-aged management of hardwood forests on carbon sequestration over time.

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Stewardship and Recreation



Trail volunteers and seasonal staff at Bee Bluff. NEAL HUMKE

When Leo Drey started the L-A-D Foundation in 1962, acquiring ecologically, geologically, or culturally significant resources for their protection and for public enjoyment was a central part of his vision for the future of his lands. Since then, the foundation's focus on stewardship and recreation has expanded beyond its original natural areas and cultural sites to include many new initiatives on Pioneer Forest. Leo Drey began this process when he donated a lease of the trails of the Roger Pryor Pioneer Backcountry to Missouri State Parks in 2002 providing for enhanced recreational access to the largest block of undeveloped land in the state. This year, we celebrate the expansion of this original trail system with the completion of the Current River Trail, thirteen years in the making.

In 2009, the L-A-D Foundation began restoration of our historic old growth shortleaf pine using prescribed fire. The beginning was a barebones effort, using borrowed equipment and borrowed personnel from organizations such as the Missouri Department of Conservation and AmeriCorps St. Louis. Over time our experience grew, and in 2014 we bought our own equipment and began recruiting individuals from around the country to join a small seasonal stewardship crew beginning each fall and continuing through the end of winter. This past year, in addition to preparing for prescribed burns, our seasonal crew restored a small glade, completed new trails, and increased our level of treatment on invasive species. We also envision using prescribed fire in combination with long-term silvicultural treatment to restore broader expanses of shortleaf pine on the forest and to expand our restoration of glade areas.

MoBCI GRANT ENABLES GLADE RESTORATION ON PIONEER FOREST

Within Pioneer's larger Pine-Oak Woodland Ecological Management Area (EMA) the careful implementation of prescribed fire was having little effect on several small glades that had been long overgrown by eastern red cedar. Our early attempts were limited by the fact that fire would not carry through glades overtaken by cedars, since the shade created by the cedars prevented the growth of grasses and other native ground flora needed to carry fire.



The L-A-D Foundation was awarded a grant by the Missouri Bird Conservation Initiative (MoBCI) in 2018 to conduct habitat restoration on one 19-acre glade within the EMA. The foundation matched the grant and hired a five-person crew for six weeks in the fall of 2018 to maintain existing fire breaks around the larger prescribed burn unit and begin clearing the dolomite glade of eastern red cedars that had encroached into the area in the absence of fire. A second five-person crew started in January 2019 to continue cutting and pile-burning cedars.

The fall 2018 stewardship crew. NEAL HUMKE

Continued on next page

Continued from previous page.

Results from the grant-funded project can be seen in the two photos below. The open condition achieved by the removal of cedars through pile burning is our preferred outcome, allowing for rapid regeneration of native herbaceous plants and the maintenance of a natural aesthetic. However, given time limitations, we modified that approach on the lower section of the glade to leave the main tree trunks in place on the ground where prescribed fire and weather effects will eventually allow the smaller-diameter cedar trunks to melt into the soil. We will continue to use pile burning in priority and high visibility areas, such as along trails. Although labor-intensive, these efforts will allow for more efficient and ecologically productive management of this area into the future.



Left: *Felled cedars are pile burned to clear the glade for native herbaceous plants.* NEAL HUMKE
Right: *The open condition of the glade resulted in a resurgence of native herbaceous plants in the first year after clearing. Restoring these natural communities helps create habitat for native bird species.* NEAL HUMKE

2019 — 2020 STEWARDSHIP CREW

This year is the first time we have hired one crew for the full season, October through March. Their work includes fireline preparation in the fall, implementing prescribed burns in the winter, treating exotic plant species, and restoring glades through cedar removal. Switching to a longer work period has helped us to invest more in the crew's training and experience during their time with us. The crew's more extended availability also means we are better able to assist the agencies and organizations we partner with in stewardship initiatives.

Once again, this year's crew includes people from several states. Mikenzie Hart is from Springfield, MO. She has a degree in fisheries and wildlife sciences and a background working in conservation research. Jacob Heslop joins us from Ohio where he received a degree in environmental science. He previously worked in native habitat restoration throughout the Midwest. Ashe Kelly joins us from Georgia with a degree in biology and experience in prescribed fire operations and habitat monitoring. Martha Maciasz is from New York, majored in biology, and has worked as a crew leader on a variety of conservation projects across the U.S. Carrie Stephen is from St. Louis, has a degree in environmental studies, and previously worked with several of our partners, including as a fire effects monitor with ONSR.



2019-2020 stewardship crew, left to right: Mikenzie Hart, Ashe Kelly, Martha Maciasz, Carrie Stephen, Jacob Heslop, and L-A-D Stewardship Coordinator Neal Humke.
KYLE STEELE

MONUMENTAL WORK ON THE CURRENT RIVER TRAIL

On Saturday, October 19, the final section of the long-awaited Current River Trail was completed. More than 130 volunteers gathered at Round Spring campground as part of the Ozark Trail Association's fall Mega Event. They received assignments and over the course of the day completed the final half-mile section of the trail between the Round Spring Loop and Echo Bluff State Park in time for a big celebration of the achievement later that afternoon.

The initial proposal for the Current River Trail was developed thirteen years ago to establish a hiking route along the river between Brushy Creek and Round Spring, crossing some of the most scenic sections of the Ozark National Scenic Riverways and the Roger Pryor Pioneer Backcountry and adding significant mileage to the existing trail systems. That original plan came to fruition in 2018, and the newly completed segment now extends the trail to Echo Bluff to join another already built segment of the trail through Echo Bluff to Current River State Park. Many of the partners are now envisioning a further extension of the trail to Pullite and eventually northwest along the river all the way to Montauk State Park.

The significant achievements to date were made possible through years of work by volunteers from the Ozark Trail Association and the Sierra Club in partnership with Missouri State Parks, the Ozark National Scenic Riverways, and the L-A-D Foundation. Additional work was made possible by the AmeriCorps St. Louis Emergency Response Team and by AmeriCorps NCCC, whose teams of AmeriCorps members completed several sections of the trail.

Establishing a New Section of the Ozark Trail. The Ozark Trail Association has proposed that trails across the Roger Pryor Pioneer Backcountry connecting the Blair Creek section of the Ozark Trail with Current River State Park be designated as a new section of the Ozark Trail. This proposal would include Laxton Hollow Trail, the main stem of the Brushy Creek Trail, and the newly-completed Current River Trail. These routes are shown on the map of the trails of the Roger Pryor Pioneer Backcountry in the Appendix. If the Current River Trail were extended to reach Montauk State Park, this new section of the Ozark Trail would follow an estimated 44 miles of the upper Current River from its origin at Montauk Spring to the main Blair Creek section of the Ozark Trail.



Left: Ozark Trail Association President Kathie Brennan instructing OTA and Sierra Club volunteers on the techniques for trail construction. GREG IFFRIG

Middle: Volunteers from the Sierra Club during their week-long construction and maintenance project. SIERRA CLUB

Right: AmeriCorps members during one of their several weeks working on trail-building along the new connector trail. KATHIE BRENNAN

COMPLETING THE CURRENT RIVER TRAIL



Top: Kathie Brennan of the Ozark Trail Association cuts a ceremonial ribbon at the trail opening; Bottom left: Dave Tobey of the Ozark National Scenic Riverways and Kathie Brennan address trail volunteers; Bottom center: Volunteers at OTA's Mega Event in October; Bottom right: Kathie Brennan addresses volunteers at the Mega Event. PHOTOS: OZARK TRAIL ASSOCIATION

ENHANCING THE RECREATIONAL EXPERIENCE ON THE PIONEER BACKCOUNTRY

When Discovery Ministries called the L-A-D office in June to obtain more detailed maps for a youth hiking trip in the Roger Pryor Pioneer Backcountry, L-A-D staff realized that new downloadable maps would be helpful. The foundation contracted with Denise Vaughn of Ozark EnviroMedia to update our smaller scale backcountry trails map and produce five larger scale maps showing smaller sections of the backcountry trail system in greater detail. The trail routes, place names, and other data have been overlaid on the 6-minute USGS topographic map, a scale already familiar to hikers. These maps now are viewable on the Pioneer Backcountry page of the L-A-D Foundation website, and may be saved or printed. Feedback about the new maps has been quite favorable.

The Ozark Trail Association has begun work on a more detailed, foldable Trails of the Roger Pryor Pioneer Backcountry map to be printed on waterproof paper. The new map will extend west from the Blair Creek Section of the Ozark Trail via Laxton Hollow Trail to Himont Trailhead, then to the Brushy Creek Trail, and connect to the Current River Trail going upriver to Round Spring and on to Echo Bluff and Current River State Parks. The map will include trailhead descriptions, contact information helpful to hikers, and a section noting trail features. This map will be available from the Ozark Trail Association, 406 W. High Street, Potosi, MO 63664.

AMERICORPS ST. LOUIS: A PARTNER IN CONSERVATION

In 2013, the L-A-D Foundation engaged a crew from AmeriCorps St. Louis (ACSTL) to assist with a prescribed burn of the Virgin Pine area along Highway 19 south of Round Spring in Shannon County. Since then, L-A-D has continued to work with teams of AmeriCorps members on special conservation projects such as trail construction and maintenance, invasive species removal, and fireline preparation. Having a trained, flexible workforce available to work alongside full-time L-A-D staff has allowed the foundation to expand its stewardship capacity and tackle emergent issues. In 2018, L-A-D engaged an AmeriCorps team to clear and complete a section of trail under development after the area was disturbed by a timber harvest. This year, L-A-D worked with a team of AmeriCorps members to conduct invasive species removal and brush thinning through the Pine-Oak Ecological Management Area.

Not only does L-A-D benefit from the availability of more hands to complete much-needed work, but the partnership is an opportunity to teach emerging conservationists about Missouri ecology:

"I appreciated that [L-A-D Stewardship Coordinator Neal Humke] spent every day in Pioneer Forest, serving alongside me and my team. He is eager to share his botanical knowledge, and he's genuinely interested in seeing us develop as conservation-minded contributors [of] society. One day when it was hot and humid (which is characteristic of Missouri summers), Neal took us on a hike through another burn unit after we had finished brushcutting for the day. The intention was to show us spotted knapweed, which we planned on pulling the next day if it rained, but instead we walked through a unique fen ecosystem, where he pointed out rare and underrated plants... I'm grateful I got the chance to serve with such a knowledgeable, caring, and fun contact."

-- Elaina Zachos, ACSTL Member

Before joining L-A-D staff, Business Manager Clare Holdinghaus-Ireland also served with AmeriCorps St. Louis. Reflecting on her experience, she says, "I learned so much in AmeriCorps, and I really felt like I could make a difference tackling some of the biggest environmental issues we're facing here in Missouri. Having that hands-on experience was why I decided to continue working in conservation."

AmeriCorps St. Louis celebrated its 25th anniversary this past year. Following President Clinton's signing of the National and Community Service Trust Act of 1993, AmeriCorps St. Louis was one of the first national service sites in the country, beginning as a pilot program in 1994. It has been one of the few programs in the country to receive federal funding from the top tier of "exemplary and demonstrable programs" every year since inception. AmeriCorps members who serve on the St. Louis Emergency Response Team engage in up to four years of service as a way to give back to their communities and their nation by tackling issues that impact our society, like natural disasters, wildland fires, and environmental and wildlife conservation issues. To date, AmeriCorps St. Louis members have served more than 3 million hours in projects state and nationwide. We are grateful to have such a resource here in Missouri, and we look forward to continued future partnership.



Top: Neal Humke with a team of AmeriCorps members, 2019. ACSTL
Bottom: AmeriCorps truck.
CLARE HOLDINGHAUS-IRELAND

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Outreach and Education



Guests at the annual Pioneer Forest community BBQ.
DENISE HENDERSON VAUGHN

The L-A-D Foundation is dedicated to the responsible management of Pioneer Forest as a working demonstration of renewable resource use compatible with the long-term productivity and health of the land and water. As part of that mission, Pioneer Forest works to educate forestry professionals, researchers, and students on its method of single-tree selection timber harvest in the hope that others will adopt this management style as a responsible way of sustaining local economies across generations while also maintaining the integrity of native ecosystems.

This year, Pioneer Forest hosted tours for foresters from Germany, students from the University of Missouri, and members of the Missouri Consulting Foresters Association. In addition, master naturalists toured the foundation's Pine-Oak Woodland Ecological Management Area (EMA) to learn about pine restoration, and staff from Lovett Pinetum gathered shortleaf pine seed as part of their ongoing work with conifer species.

L-A-D staff and board members participated in several conferences throughout the year to highlight the foundation's work and to learn more about ways we can partner in state and nationwide conservation efforts. The foundation also co-sponsored production of a video on Perry County's karst plain and the importance of protecting the quality of groundwater that was shown at this year's National Cave and Karst Management Symposium in Virginia.

We have steadily increased our outreach over the past few years. During strategic planning this year, foundation board and staff agreed to continue to enhance our outreach to local communities, private landowners, and the public in the coming years. We are also considering ways to further our involvement in local, national, and international partnerships, build on our successes, and find new ways to reach audiences near and far.



European foresters tour Pioneer Forest, June 2019. HERMANN RODENKIRCHEN

EUROPEAN FORESTERS TOUR PIONEER

On June 17-18, Pioneer Forest staff and several board and advisory council members led a tour of sixteen German, Swiss, and Austrian foresters across parts of the forest. The foresters were members of Germany's Arbeitsgemeinschaft Naturgemäße Waldwirtschaft (ANW), which advocates close-to-nature forestry, often called Dauerwald or Plenterwald Forestry. Through this practice, foresters select individual trees for harvest while maintaining at least three distinct age classes of trees. In fact, their methods closely resemble the methods of management used by Pioneer Forest. The group viewed a recently harvested area, an active timber sale, and an area due for harvest.

There was very good dialogue both in the field and at a welcome dinner and program on Pioneer Forest and the L-A-D Foundation the previous evening. A tremendous amount of information was shared on the challenges of maintaining the uneven-aged character of a fully stocked forest. The European foresters manage many privately-owned tracts that have been in family ownership for generations. Their management combines ecological, social, environmental, aesthetic, and monetary benefits of doing periodic harvests. Pioneer Forest is also focused on these aspects of forest management and has been for more than 65 years. The European foresters urged Pioneer leaders to visit them in Europe to continue the dialogue.

UNIVERSITY OF MISSOURI FORESTRY STUDENT TOUR

Pioneer Forest also hosted a group of about fifteen University of Missouri Field Studies students in June for a brief history of the forest and a tour of the Virgin Pine area and Pine-Oak Woodland EMA to discuss shortleaf pine management. Afterwards, students viewed an active timber sale, where they were guided through the tree selection process and marked trees for harvest. The next day they toured RNS Wood Products in Bunker so they could see how logs go from the forest to the sawmill and are processed into grade lumber, railroad crossties, and blocking, the latter at RNS's new blocking processing mill that cuts stringers and pallet stock for the pallet industry. This helped the students understand how different grades of trees can be utilized in different markets.

MISSOURI CONSULTING FORESTERS ASSOCIATION TOUR

In October Pioneer Forest staff hosted a tour with the Missouri Consulting Foresters Association for their fall meeting. The group toured the Pine-Oak Woodland EMA where discussion centered on opportunities for natural community management including woodlands and glades, which are becoming more important to private landowners. Challenges to using fire in red oak stands while trying to maintain pine regeneration and other native plant species were also discussed in detail.

The tour stopped along the Capps Hollow road to see an excellent stand of uneven-aged timber. More landowners are becoming interested in uneven-aged management because of its multiple benefits, not least of which to leave an intact forest behind after harvest. The discussions focused on costs and benefits of using uneven-aged management, discussions with landowners before, during and after harvests, and how regional markets can affect management decisions. Stand dynamics and post-harvest density are important considerations when planning for single tree selection harvests. Scientific research and experience from other professionals provided a full discussion of uneven-aged forest management.



Pioneer Forest Manager Jason Green discusses shortleaf pine during a tour with the Missouri Consulting Foresters Association. BRANDON KUHN

EUROPEAN FORESTERS TOUR PIONEER



Top left: A visiting forester listens to Pioneer staff describe forest management in the Roger Pryor Pioneer Backcountry. HERMANN RODENKIRCHEN

Top right: L-A-D Advisory Council member Jim Guldin (left) talks with a visiting forester. HERMANN RODENKIRCHEN

Center left: Pioneer Chief Forester Brandon Kuhn (left) and Forest Manager Jason Green (right) describe forest management techniques. HERMANN RODENKIRCHEN

Center middle: Tour group in the Roger Pryor Pioneer Backcountry. HERMANN RODENKIRCHEN

Center right: L-A-D Stewardship Coordinator Neal Humke (right) talks with a visiting forester. HERMANN RODENKIRCHEN

Bottom left: Chief Forester Brandon Kuhn describes timber harvests at a log landing. HERMANN RODENKIRCHEN

Bottom right: A group of European foresters asks questions during the tour. NEAL HUMKE

VISITS TO L-A-D FOUNDATION LANDS

Each year various groups and individuals visit, tour, or volunteer to work on Pioneer Forest and other L-A-D Foundation lands. This past year included:

April 13. Family of former long-time Forest Manager Ed Woods visit the Pioneer office.

April 24. L-A-D board and advisory council members visit sites to discuss management challenges.

May 25-28. Burroughs School seniors work on the Current River Trail across the Backcountry.

June 6. Meramec Hills Master Naturalists visit Pioneer's Pine-Oak Woodland Ecological Management Area on a scouting trip to plan for an educational program in the fall.

June 18. European foresters tour Pioneer Forest to view management practices.

June 20. Tim Barksdale, videographer, visits Current River Natural Area with retired Forest Manager Terry Cunningham as part of a video project on early Missouri conservation history.

June 27. Tim Barksdale, videographer, visits Pioneer Forest office to interview Terry Cunningham.

September 21. Meramec Hills Master Naturalist members visit Pioneer's Pine-Oak Woodland Ecological Management Area to learn about Pioneer's history of forest management.

September 22. Lovett Pinetum staff collect seed at Virgin Pine for germination project at their arboretum in Springfield, MO focused on conifers.

October 18. Missouri Consulting Foresters visit Pioneer's Randolph Tract to discuss pine management.

October 18 – 27. Volunteers from the Ozark Chapter Sierra Club undertake a week-long trail construction and maintenance project in the Roger Pryor Pioneer Backcountry.

October 19. Ozark Trail Association launches Fall Mega event from Round Spring Campground, completing the final section of the Current River Trail between Brushy Creek and Echo Bluff State Park.

November 9. Linda Pryor, wife of Roger Pryor, visits the Roger Pryor Pioneer Backcountry.



Left: Videographer Tim Barksdale examines a large red oak at Current River Natural Area with former Pioneer Forest Manager Terry Cunningham; Top right: Forest researchers tour the Pine-Oak Ecological Management Area. NEAL HUMKE; Bottom right: Linda Pryor, wife of the late Roger Pryor, visits the Pioneer Backcountry. JOHN KAREL

L-A-D-FUNDED VIDEO SHOWN AT NATIONAL CAVE CONFERENCE



Top: Title frame from the recently completed video.
Bottom: Videotaping in a cave beneath the city of Perryville, MO in 2016. From left: videographer Neil Rosenbaum, producer Denise Henderson Vaughn, cave biologist Mick Sutton, and Sue Hagan.
KEN GRUSH

“Karst in Perry County,” a 20-minute documentary video funded in part by the L-A-D Foundation, is scheduled for release next spring. It explores karst topography, caves, and sinkholes in one Missouri county and follows the controversy that developed there concerning the federally endangered grotto sculpin that lives in those caves. The documentary shows how local adaptations to Perry County’s karst environment have changed over time. In recent years, the community has turned the sculpin controversy into proactive efforts to improve water quality. Local landowners and others are cooperating with city, county, state and federal officials, and private organizations to remove trash from sinkholes, buffer them with native ground flora, and prevent sediment and agricultural chemicals from entering groundwater and caves.

Even before its completion, the video was featured as an invited presentation at a national conference. In August, following a preview screening for L-A-D staff, board, and other stakeholders, Scott House, regional director of the Cave Research Foundation (CRF), arranged for the first cut of the video to be shown at the National Cave and Karst Management Symposium, held in October in Bristol, VA.

The video was produced by conservation media specialist Denise Henderson Vaughn who secured additional funding from the Ozarks Resource Center in West Plains. Some images and other assistance were provided by MDC, CRF, caving clubs, local newspapers and landowners, and the City of Perryville. Plans for distribution are underway.

L-A-D REPRESENTED AT STATE AND NATIONAL CONFERENCES

Missouri Natural Resources Conference.

For the third consecutive year, participants at the Missouri Natural Resources Conference (MNRC) were able to learn about L-A-D and Pioneer Forest’s mission and accomplishments by visiting our exhibit. Our staff had great opportunities to make connections with fellow natural resource professionals.

Discussions at the booth included conversations about Pioneer’s timber management, protecting caves and grotto sculpin in Perry County, founder Leo Drey’s vision, the devastating derecho windstorm ten years ago, the 2015 cleanup of vandalism to our Chalk Bluff property on the Jack’s Fork River, and hiking opportunities in the Roger Pryor Pioneer Backcountry.



Forest Manager Jason Green, left, and Chief Forester Brandon Kuhn, second from right, interacted at the conference with fellow professionals from the MU Forestry Department, U.S. Forest Service and Missouri Department of Conservation.
DENISE HENDERSON VAUGHN

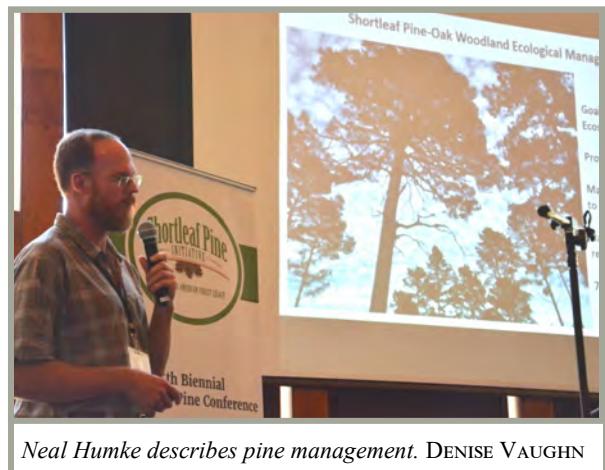
Representing the foundation at the conference, held February 5-7, 2019, at Tan-Tar-A resort in Osage Beach were Forest Manager Jason Green, Chief Forester Brandon Kuhn, Forester Dustin Collier, and Media Specialist Denise Vaughn. Jason Green was a speaker on a panel highlighting white oak production.

Conservation Federation of Missouri. The L-A-D Foundation was represented at the CFM convention in Jefferson City March 8-9 and at CFM's Affiliates Summit in September by Susan Flader.

Missouri Land Trust Coalition Meeting. A new coalition of land trusts and related organizations in Missouri has been formed to share information, build partnerships, and cooperate on policy initiatives, communications, and education. At its most recent annual gathering in Columbia June 19, L-A-D was represented by President Susan Flader and Board Liaison Greg Iffrig.

Forest Stewards Guild Field Trip in the Maine Woods. President Susan Flader participated on a field trip in August organized by the Forest Stewards Guild (FSG), a national organization for responsible forestry of which longtime Pioneer Forest Manager Clint Trammel was a founder, on parts of a 100,000-acre working forest assembled since 2003 by the Appalachian Mountain Club (AMC). The purpose of AMC's Maine Woods Initiative is to conserve forestlands and ecological reserves in order to demonstrate sustainable forestry and carbon sequestration, restore streams and biotic diversity, provide recreation and education, and contribute to regional community development—a vision and goals very similar to those of Leo Drey and the L-A-D Foundation. AMC, FSG, and L-A-D have a lot to learn from each other. It was an inspiring few days full of ideas for L-A-D in its strategic planning.

Shortleaf Pine Conference. The 5th Biennial Shortleaf Pine Conference, which brings together owners and managers of private lands, scientists, and officials of state and federal agencies and non-governmental organizations from states in the natural range of shortleaf pine extending from Florida to New Jersey and westward to Texas, was held for the first time this year in Missouri. The conference is the work of the Shortleaf Pine Initiative which formed in 2013 to focus attention on the extensive and rapid loss of shortleaf pine habitat. Representing L-A-D at the event held October 1-3 in Van Buren were President Susan Flader and Stewardship Coordinator Neal Humke.

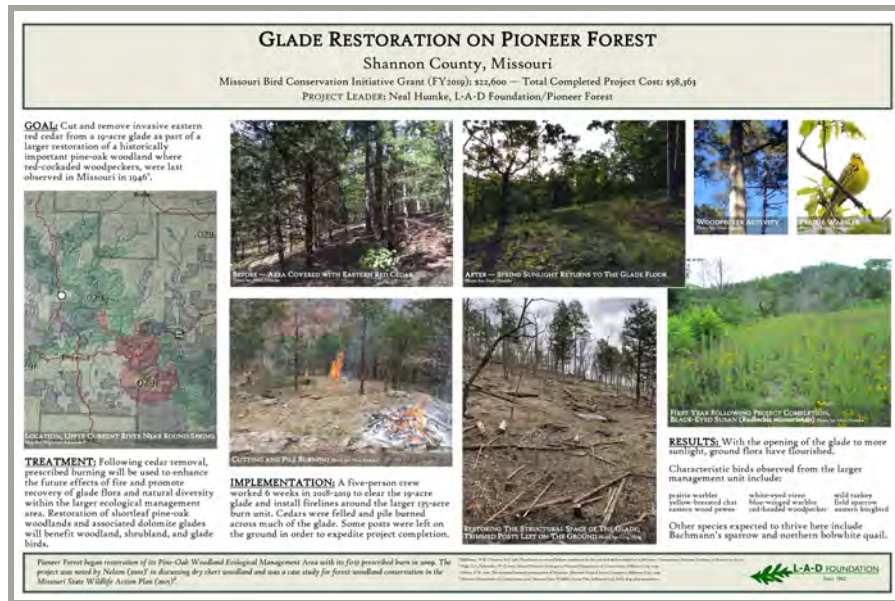


Neal Humke describes pine management. DENISE VAUGHN

With nearly 30 percent of the standing volume of Pioneer Forest in shortleaf pine, Neal Humke presented a brief history of pine on the forest and described the challenges and successes of Pioneer's use of prescribed fire to manage shortleaf pine and promote its reproduction. He told how the Virgin Pine tract along Highway 19 south of Round Spring includes some of the oldest living pine in Missouri; it is part of a stand that germinated around 1780 following a fire. Before Leo Drey acquired the land in 1954, a previous owner, Pioneer Cooperage, had sold off the pine to a lumber company, except for a narrow strip along the highway that was sold to the highway department for its scenic value. The firm was subsequently persuaded to negotiate an agreement to reserve approximately 1,000 more old-growth trees scattered over some 3,000 yet-uncut acres to remain as seed trees. A 1952 wildfire cleaned the slate for shortleaf pine reproduction. Large numbers of pine germinated, and are now almost 70 years old.

Humke told attendees that about ten years ago, Pioneer Forest's CFI showed that pines were adding volume but that there had been little regeneration in recent years. In response, foresters set a new management goal, to use fire on about 700 acres to try to stimulate natural regeneration. Implementing fire involved some challenges, he explained. Staff did not want to harm valuable but fire-sensitive scarlet oak or damage the feeder roots of old-growth pine, which had crept into a six-decade accumulation of duff about 2-4 inches thick. To avoid these hazards, for the first few years crews used cool, slow fires, starting with the old-growth area along Highway 19. Pine seed production was exceptional in the winter of 2013-14, and a large number of seedlings sprouted following prescribed burns. They are now growing well, along with other native ground flora. Given this unique system's dependence on fire, "pine woodlands will only persist with active, ongoing management," Humke said.

Missouri Bird Conservation Initiative. The MoBCI conference annually brings together representatives of some 75 organizations and agencies interested in birds and bird conservation in Missouri. At the August 23-24 gathering in Columbia, L-A-D President Susan Flader served as keynote, speaking about “Missouri Political Culture and its Conservation Legacy.” Needless to say, Leo Drey was part of that legacy. Also representing the foundation was Land Stewardship Coordinator Neal Humke.



L-A-D and Pioneer Forest presented a poster at the MoBCI conference highlighting the grant-funded glade restoration taking place in the Pine-Oak Woodland Ecological Management Area. Work done on this glade benefits many bird species including prairie warbler, white-eyed vireo, wild turkey, yellow-breasted chat, blue-winged warbler, field sparrow, eastern wood pewee, red-headed woodpecker, and eastern kingbird.

POSTER: GREG IFFRIG, NEAL HUMKE, AND CLARE HOLDINGHAUS-IRELAND

MDC Private Lands Service Conference. At the annual gathering of some 80 MDC staff who work with private landowners statewide, held October 1-2 in Springfield, Susan Flader was invited to present an historical perspective on private land conservation in Missouri. She discussed Aldo Leopold’s influence during MDC’s formative years in emphasizing an ethic of private land stewardship, and Leo Drey’s inspirational demonstration of that ethic during the second half of the 20th century through Pioneer Forest and the L-A-D Foundation.

Missouri Conservation Partners Roundtable. At the 2019 gathering of more than 250 representatives of private and public organization partners of MDC held October 3 in Columbia, L-A-D Director Rick Thom presented at a workshop on “What is Nature Worth?” He discussed the concept of ecosystem services as a way of more fully analyzing, evaluating, and understanding the many services provided free by healthy natural systems and the incredible costs to society when natural systems are degraded and cease to function properly.

Land Trust Alliance Rally in Raleigh. Business Manager Clare Holdinghaus-Ireland attended the 2019 Land Trust Alliance Rally in Raleigh, NC, October 17 - 19. This was the first time L-A-D participated in this conference, which features over 1,600 attendees from land trusts nationwide. The conference was very informational, with sustainable timber harvest and climate change being large topics of conversation. While L-A-D is not a traditional land trust, the foundation has many of the same goals and faces many of the same challenges. Opportunities to learn from other land management professionals and discuss topics of mutual interest can help L-A-D better position our work within a national context. We will look at ways to stay connected to the larger land trust community in the future.



The Ozark Regional Land Trust became the first accredited land trust in Missouri this year. Our congratulations to ORLT!
LAND TRUST ALLIANCE

WEBSITE UPDATES

We have completed several significant improvements to the L-A-D Foundation website, including the addition of a site search capability, more photos and videos, updated maps, and a tracking capability that allows L-A-D staff to understand the relative popularity of each page and each platform.

One addition is a video introduction to the Clifty Creek page. If video content like this proves popular, similar short overview videos may be developed for other pages. L-A-D staff also posted clips from an existing Model Forest Policy Program video featuring Pioneer Forest Manager Clint Trammel. These video clips can be found on the Pioneer Forest Primer page, where they supplement information on Pioneer's sustainable uneven-aged method of timber harvest.

The Biological Benefits page was expanded to describe the foundation's Ecological Management Areas, and several other pages were rewritten to encompass new information about our stewardship work. Likewise, the bibliography of research articles related to Pioneer Forest and the L-A-D Foundation was enhanced considerably. Site visitors can view or download the complete bibliography. Lastly, about 40 large photos were incorporated throughout the site to give visitors a better sense of L-A-D lands and projects.

This year's website improvements were made possible by the addition of a part-time office and outreach assistant to the L-A-D staff. Nancy Thompson worked with board liaison Greg Iffrig and tech consultant Bryon Craig to coordinate these updates. Future website updates are in the works, and the foundation welcomes public feedback on content.

PIONEER FOREST'S COMMUNITY BBQ

This year's community BBQ at the Pioneer Forest office in Salem brought together several generations of Pioneer staff and family. Former Forest Manager Clint Trammel was inducted posthumously into the Missouri Conservation Hall of Fame at a ceremony led by MDC Director Sara Parker Pauley. Clint's family was in attendance to accept the award on his behalf. After the awards ceremony, staff and board members got to hear about Clint's sons' experience growing up in Salem and reminiscences about playing at the Pioneer office.

Glen Woods also visited Pioneer Forest for the annual BBQ with his wife Mary. Glen is the son of Leo's first manager, Ed Woods. Glen shared stories about his family and the many square dances they attended as children in the Pioneer warehouse, where the BBQ is now held. Glen lives in the Rolla area with his wife. Having Glen there enriched the event with his memories of the early days of the forest when his dad worked for Leo.

Once again, this event brought together neighbors, partners, and friends of Pioneer Forest on a beautiful evening. About 180 people from the Ozarks and beyond were in attendance for the dinner, catered by Tiny's Hillbilly BBQ.



Top: The Trammel family accepts a plaque from Kay Drey, Susan Flader, and Jason Green.
DENISE HENDERSON VAUGHN
Bottom: L-A-D President Susan Flader talks with Glen and Mary Woods. CLARE HOLDINGHAUS-IRELAND

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RESEARCH AND MONITORING
STEWARDSHIP AND RECREATION
OUTREACH AND EDUCATION
GRANTMAKING AND COMMUNITY SUPPORT
PUBLIC POLICY
ADMINISTRATION

Grantmaking and Community Support



A 2018 L-A-D Foundation grant funded new equipment for the ACSTL Emergency Response Team. AMERICORPS ST. LOUIS

Since 1962, the L-A-D Foundation has awarded over \$600,000 in small grants to more than 65 nonprofit and public interest organizations. Our focus is on providing grants to organizations that have a positive impact on the Missouri Ozarks, particularly in conserving natural and cultural resources and engaging young people from the Ozarks. In addition, Pioneer Forest supports local community projects and provides scholarships for area high school students. As we plan for the future of the foundation, we are considering ways we can expand our impact within the region and address the needs of the communities where we work.

2019 L-A-D FOUNDATION GRANT RECIPIENTS

In October 2019, the L-A-D Foundation Board of Directors approved the following grant awards:

- **AmeriCorps St. Louis** — Backpack blowers and drip torches for prescribed fire and conservation work in Missouri.
- **Carnegie Museum of Natural History** — Research into the effects of salvage harvest after disturbance events, such as the 2009 derecho.
- **Grand Gulf State Park** in partnership with the **Ozarks Resource Center** — Program to engage students in bird monitoring at Grand Gulf.
- **Greater Ozarks Audubon Society** — Scholarships for Ozarks high school students to attend the Green Leadership Academy of Diverse Ecosystems (GLADE).
- **Greenbelt Land Trust of Mid-Missouri** — Landscape restoration on the Hundred Acre Wood Nature Preserve in Boone County.
- **Missouri Archaeological Society** — Archaeological Survey Training program at the Piney River Narrows.
- **Missouri Caves and Karst Conservancy** — Equipment costs for the cleanup of Goodwin Cave.
- **Missouri Environmental Education Association** — Development of a teaching curriculum around invasive bush honeysuckle.
- **Missouri Parks Association** — Expansion of the Urban Populations Outreach Program (UPOP) into the Missouri Ozarks.
- **Ozark Trail Association** — Reprinting 3,000 Ozark Trail maps.
- **Sierra Club, Missouri Chapter** — Outreach and education regarding management of National Park lands along the Current River



*Clare Holdinghaus-Ireland with AmeriCorps St. Louis Program Fellow Jane Kersch.
KELLEY HOWER*

2018 GRANT PROJECTS



Top left: *A volunteer signs in on a new Chromebook, OZARK TRAIL ASSOCIATION*
 Top right: *2019 Green Leadership Academy for Diverse Ecosystems, GREATER OZARKS AUDUBON SOCIETY*
 Middle left: *AmeriCorps members with new brushcutters, AMERICORPS ST. LOUIS*
 Middle right: *Students inventory plants at the 2019 GLADE, GREATER OZARKS AUDUBON SOCIETY*
 Bottom left: *AmeriCorps member with new fire equipment, AMERICORPS ST. LOUIS*
 Bottom right: *Paddle Ozarks, STREAM TEAMS UNITED*

SUPPORT FOR MCE, GREAT RIVERS ENVIRONMENTAL LAW CENTER



Left to right: Roger Pryor (for whom the Pioneer Backcountry is named), Leo Drey, and Lewis Green, three early leaders of the Missouri Coalition for the Environment.

The Missouri Coalition for the Environment (MCE) celebrated its 50th anniversary in 2019. The organization was founded in 1969 as the region's first independent citizens' group focused on addressing a broad range of environmental issues. Even before the establishment of the Environmental Protection Agency or the Department of Natural Resources, MCE was working to ensure clean air and safe water for all Missourians. Among MCE's original founders was its first president and L-A-D founder Leo Drey.

Also this year, Kathleen Henry retired after 15 years serving as executive director of the Great Rivers Environmental Law Center. Kathleen's father, Lewis Green, founded the law center 2002 in order to provide free and

reduced-fee legal services to individuals, citizens' groups and environmental organizations that seek to preserve and protect the environment and public health. Lewis Green was also a co-founder of MCE and worked closely with Leo Drey for years on a variety of issues.

In recognition of our shared history and the continuing good work of both organizations, the L-A-D Foundation made contributions to MCE and Great Rivers Environmental Law Center this year.

2019 PIONEER FOREST SCHOLARSHIP RECIPIENTS

Bunker High School. Aiden Cumins will attend the University of Missouri-St. Louis and major in accounting and finance. She would like to be a certified public accountant.

Ellington High School. Justin Dane is enrolled in the master pipe welder program at the Missouri Welding Institute in Nevada, MO.

Eminence High School. Audrey Simmerock plans to attend College of the Ozarks and receive a degree in nursing to become a registered nurse.

Summersville High School. Leatha Keller will attend College of the Ozarks and major in agribusiness or natural resources. She would like to work at the Texas County Soil and Water Conservation office.

Van Buren High School. Will Towner plans to attend Three Rivers College in Poplar Bluff, MO. He is pursuing a degree in forestry and would like to be a conservation agent someday.

2019 LOCAL COMMUNITY SUPPORT

Stream Team 1028. Support for river cleanup on the Upper Current.

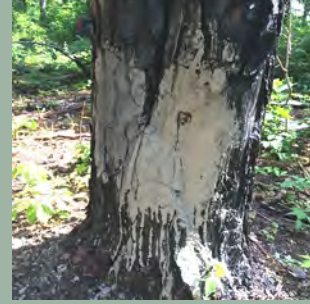
Salem R-80 Project Graduation. Support for the Salem High School graduating senior class.

Eminence Chamber of Commerce. Support for the annual Ozark Mountain Festival.

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PUBLIC POLICY
ADMINISTRATION

Public Policy



Hog rub on a tree on Pioneer Forest. GREG IFFRIG

The L-A-D Foundation encourages projects and policies that have a positive impact on the Ozark region and beyond. In recent years, there have been several issues of high priority. The foundation has followed the general management planning process at the Ozark National Scenic Riverways, particularly the planning for roads and trails in the park. We maintain strong interest in these efforts, urging that agency management is adopted that provides for strong protection for the natural, cultural, and scenic values along the Current River. Other matters that directly impact the lands we manage are Missouri liability laws regarding prescribed burning and statewide trapping efforts to eradicate feral swine.

ONSR ROADS AND TRAILS: WORKING WITH BACKCOUNTRY HORSEMEN



BCHMO managers ride, 2019.
BACKCOUNTRY HORSEMEN OF MISSOURI

Consideration of roads and trails pursuant to the Ozark National Scenic Riverways (ONSR) General Management Plan has been underway for at least five years. Our hope is that provisions of the forthcoming draft Roads and Trails Plan will help reduce impacts to terrestrial and aquatic resources throughout the national park.

As part of its public comments in January 2018, the L-A-D Foundation urged National Park Service (NPS) to consider routing equestrian trails along one side of the river instead of along both sides, designate more equestrian routes and loops away from the narrow riverways corridor, minimize horse trails in heavily used areas, and reduce equestrian crossings of the river.

To envision the possibilities along the upper Current River between Montauk State Park and Akers Ferry, which currently has no designated trails but a maze of social trails, L-A-D staff mapped potential equestrian trail routes against our land ownership, NPS-owned land, and other private lands. After review by the foundation's stewardship committee and staff, proposed routes were discussed with leadership of the Backcountry Horsemen of Missouri (BCHMO). We were able to reach consensus on what the best outcome might be to protect the narrow ONSR corridor while providing more designated equestrian trails. BCHMO then continued the effort by contacting other private landowners regarding their willingness to accommodate equestrian use across their lands beyond the riverways boundary if needed. Results so far have been encouraging.

We see at least two possibilities for loop trails in the Upper Current River region extending well beyond the river's edge and outside the park. We hope NPS will seek participation from other public and private landowners. We acknowledge the need for several river crossings and encourage the use of existing bridges such as the crossing at Cedar Grove. The L-A-D Foundation and BCHMO agree that there should be no trails at the Welch Spring area where there are already multiple uses and adding an equestrian trail would require new construction within a crowded area.

GENERAL LIABILITY INSURANCE FOR PRESCRIBED FIRE

In June 2018, our former general liability insurance provider informed the foundation that they would no longer cover the use of prescribed fire for the management of our land. While we were able to find another carrier that was able to provide the foundation with coverage, this remains an issue of concern for all private land managers using prescribed fire in the state of Missouri. It is also a topic of increasing concern nationwide.

At the national level, insurance companies have seen large fire-related losses over the past decade. Most of this is driven by the catastrophic wildfires plaguing western states. In response to increasing patterns of financial loss, many insurance underwriters have been looking for ways to scale back, or completely drop, this category of coverage for certain geographic areas and certain types of risk exposure. Although careful use of prescribed fire reduces the overall risk of catastrophic wildfire by reducing fuel loading across the landscape, from an insurance perspective, any intentional fire starts can create risk of financial liability. At the Land Trust Alliance Rally this year, insurance experts warned land trusts that fire coverage may become more difficult to obtain over time as the insurance industry catches up to the realities of climate change. If this proves true, it could have the unfortunate effect of limiting the very land management practices that lower the risk of wildfire.

In Missouri, private landowners seeking liability insurance for prescribed fire face fewer carriers and higher costs than many other areas of the country. Missouri has an undefined liability standard, which means that the level of liability held by the landowner or prescribed fire manager is left undetermined by statute. Given the legal uncertainty, insurance providers find it difficult to set appropriate rates, and many simply decline to get into the market at all. Some options for coverage remain; however, these options may not be available to all landowners. The L-A-D Foundation was able to identify two underwriters willing to offer coverage, but our current coverage was obtained largely because prescribed burning is a very small part of what we do. Other organizations that rely more heavily on prescribed fire to manage their lands have found it more difficult, if not impossible, to obtain coverage. It may be that the new Missouri Land Trust Coalition will be able to suggest approaches to this problem.



Prescribed burn at Pioneer Forest's Pine-Oak Woodland Ecological Management Area, 2018. This burn was conducted on a very cold day to reduce the risk of fire scarring to the hardwood tree species interspersed throughout this area. BRANDON KUHN

Prescribed burns can be conducted safely, and there are ways for private landowners to reduce risk and liability when maintaining landscapes with fire. Financial and technical assistance may be available through the Natural Resources Conservation Service or the Missouri Department of Conservation. Preparing adequate fire lines is often a prerequisite for enlisting the service of a private contractor. As a private landowner we keep good records of work completed, develop and follow prescribed burn plans that are reviewed by MDC, conduct comprehensive safety briefings for all personnel, and follow pre-burn notifications required by state and local authorities. We also closely monitor weather conditions (wind speed, direction, temperature, and humidity) in accordance with our management plan.

Additionally, the Missouri Prescribed Fire Council (MPFC) has focused on developing Prescribed Burn

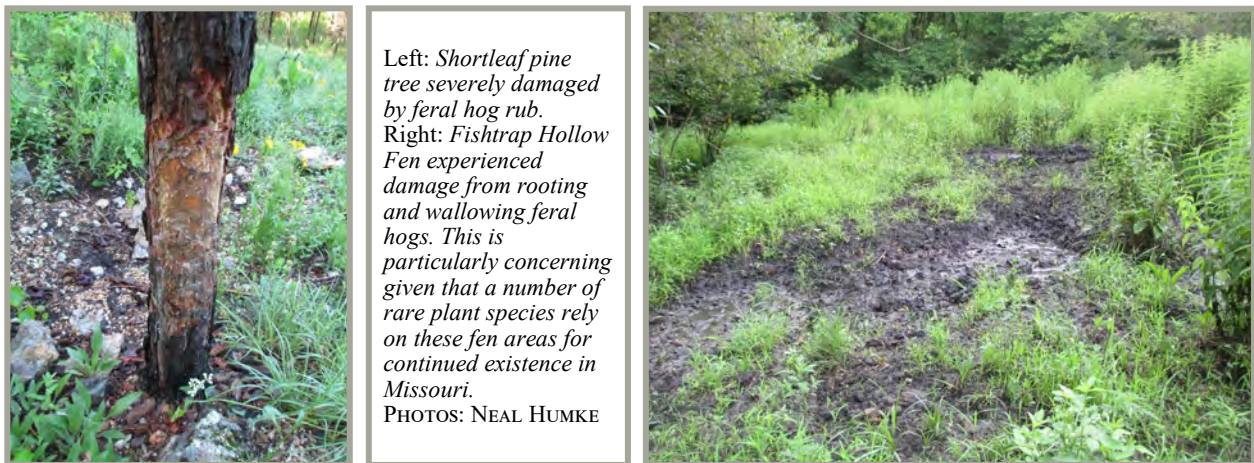
Associations (PBAs) through which private landowners are pooling resources to be able to apply prescribed fire and obtain coverage. There are seven PBAs in Missouri, including the Ozark PBA centered in Van Buren.

One way or another, prescribed fire remains a valuable method of restoring native plant species and reestablishing habitat for a wide range of animal species in Missouri. It is also an essential part of our plan for shortleaf pine regeneration on Pioneer Forest, and we will work to find ways to continue to implement prescribed burns safely into the future.

ERADICATING FERAL SWINE

In May 2019 Mark Twain National Forest (MTNF) announced its proposal to ban the take, pursuit, or release of feral hogs on the forest, similar to closures already in place on MDC, DNR, L-A-D, Corps of Engineers, and other public lands in Missouri. During the public comment period foundation board and staff presented our experience and views as a private landowner to help counter misinformation about the impact of the ban on landowners near the MTNF. We supported the ban on hog hunting and provided our perspective to media outlets and at in-person meetings with various officials.

Years of vigilance on Pioneer Forest have confirmed the damage these non-native animals have caused. They compete with native wildlife for forage. Their rooting in search of food disturbs soil, particularly in areas with soft soil. Swine have already caused extensive damage to glades, uprooting the rocky substrate. Feral swine likewise degrade wildlife ponds, seeps, springs, and fens. The damage in these areas is of heightened concern due to the rare plant species they contain. The hogs also do major damage to agricultural crops and pastures, and they carry numerous diseases they can spread to domestic livestock as well as wildlife, pets, and humans.



Efforts to eradicate feral swine have grown rapidly throughout the state in recent years as hog numbers and damage mounted along with indications that hogs were being intentionally, illegally, and clandestinely released on public lands. Researchers at the National Wildlife Research Center in Colorado and USDA-Animal and Plant Health Inspection Service (APHIS) used genetic code to establish 13 distinct feral swine populations in Missouri. This work has confirmed that human release of swine into the wild is part of the problem. Once hogs are in the wild, hunters using running dogs can scatter sounders and foil other efforts by disturbing pigs near a bait or trap location. Additionally, individuals with hunting access to a large public land holding like the Mark Twain may illegally release feral swine there in order to have more recreational opportunity while bearing none of the damage caused by the hogs.

In 2016, after decades of trying to combat the hogs by a combination of hunting and professional trapping, and after studying the experience of other states in controlling or failing to control hogs, the Missouri Department of Conservation (MDC), the Corps of Engineers, the L-A-D Foundation, and others changed their strategy, prohibiting feral hog hunting on lands they own and manage and focusing on trapping. The next year, the Missouri Feral Hog Partnership, which had been organized in 2007 and by 2017 had grown to some thirty conservation and agricultural agencies and non-government organizations, issued a “Statewide Strategic Plan for Feral Hog Elimination.” Their greatest success to date with the new strategy has been in the Stockton-Pomme-Truman Reservoir area, where all public land is closed to hog hunting and there is no Mark Twain land.

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Through meetings with USDA and MDC employees and other experienced trappers, Pioneer Forest staff have developed a working knowledge of the equipment and tactics necessary for feral hog trapping. The Pioneer budget has been adjusted to allot funding for costs including corn for bait, trail cameras, hand tools, and materials for drop trap construction, along with funds to work with an experienced trapper. But with miles of boundary shared with the Mark Twain from which hogs can continue to enter Pioneer, it seemed at times like a losing battle.

Finally, after years of being stymied in its effort to cooperate with the Missouri Feral Hog Elimination Partnership owing to lack of support by key members of the state's congressional delegation, which was being heavily lobbied by a small number of hog hunting enthusiasts to pressure Forest Service leadership in Washington, DC, the Mark Twain on December 7 announced that it would follow through with its proposed closure of the forest to hog hunting. L-A-D board and staff breathed a sigh of relief, even though the announcement came with a concession: licensed deer and turkey hunters hunting legally with unfilled permits would be allowed to opportunistically take feral hogs during deer and turkey seasons. Since hogs are not attracted to baited traps when acorns and other mast is readily available, especially during deer season, this change could work. MDC has indicated its intent to follow the same policy on its lands, and other agencies will likely follow.

With the Mark Twain now on board, buoyed by overwhelming support among the 1,200 citizen comments submitted last summer, the Feral Hog Partnership is gearing up for a major effort beginning in January 2020 at highly coordinated trapping and related eradication efforts on both public and private lands in priority areas. Pioneer Forest will continue to work with agency partners toward the eradication of feral hogs across our ownership and cooperate with the larger partnership effort statewide. Our protocols for the capture and then dispatch of feral swine with firearms are like those utilized by trappers for the MDC, USDA-APHIS, and US Fish and Wildlife Service. Pioneer staff are continuing to increase their time spent toward feral hog trapping and plan to hire an experienced trapper dedicated to hog eradication in the Backcountry. It will take all of the players involved to communicate and work together to solve this serious problem.



Above: Pioneer Forest Manager Jason Green with a large hog trapped on Pioneer Forest in 2019. BRANDON KUHN
Left: Hogs taken from a trap on Pioneer Forest. BRANDON KUHN

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PUBLIC POLICY
ADMINISTRATION

Administration



*John Karel and Steve Mahfood
at an L-A-D board meeting.*
DENISE HENDERSON VAUGHN

Following the completion of the 2017 Continuous Forest Inventory and Pioneer Forest's first carbon study in 2018, the L-A-D Foundation board was left with several big-picture questions about the future of the forest. This year, our focus has been on tackling these questions and discussing the overall direction of the organization through a renewed strategic planning effort. The finalization of this plan will start the foundation on its next phase, continuing our tradition of careful stewardship of our resources while also finding ways to expand our impact both in the Ozarks and nationally.

The foundation also welcomed several new members this year. Roger Still joined the board as a director in October. Levi Bachmann joined Pioneer staff as a forester and Nancy Thompson started as the L-A-D Foundation's first office and outreach assistant.

Even as we look forward, this year has also been one of honoring the past. The foundation lost longtime board member Leon Cambre in July. Former director Jerry Vineyard was honored at an event in Perry County in March, and former Pioneer Forest manager Clint Trammel was inducted into the Missouri Conservation Hall of Fame in May. Several current board members were recognized for their long service to conservation in Missouri: John Karel was inducted into the Missouri Recreation and Parks Hall of Fame, Wayne Goode received the Missouri Historical Society's Thomas Jefferson Award, and Leo and Kay Drey and Steve Mahfood were honored with the Missouri Coalition for the Environment's first lifetime achievement awards at the Coalition's 50th anniversary gala in November.



This year L-A-D Foundation founders Leo and Kay Drey were honored for their lifelong dedication to conservation by the Missouri Coalition for the Environment. The L-A-D Foundation has benefited enormously from their guidance and generosity over the years, and we look to their examples as we consider the future of our organization through this year's strategic planning process.

MISSOURI DEPARTMENT OF
CONSERVATION

L-A-D FOUNDATION UNDERTAKES STRATEGIC PLANNING

The L-A-D Foundation Board of Directors and key staff and advisors participated in a strategic planning retreat held at the Pioneer Forest office in Salem in August 2019. Over the course of three days, they reviewed the foundation's mission, goals, and operations, and its strengths, weaknesses, challenges, and opportunities, led by consultant Roger Still. Work groups were formed to identify actionable items around four major initiatives, and the board continued to refine its roadmap for the future of the foundation in the following months.

The framework for the current planning process builds on the most extensive previous planning process conducted in 2012, led by former board member Rindy O'Brien. It builds on the original mission statement and strategic goals identified during those previous sessions, while also looking at the possibility for an expanded scope for the L-A-D Foundation's work, especially concerning the challenges of maintaining an uneven-aged forest now that the most recent Continuous Forest Inventory indicates the forest is fully stocked, a greater emphasis on stewardship on the forest and our other special areas, and opportunities for greater outreach and education, research, and support for Ozarks communities. Climate change and the future of Missouri's timber industry and markets were central topics of conversation; both will be large factors in the future of the foundation's work, as will be the need to develop and sustain an organizational structure that enables the foundation to accomplish its charitable mission in perpetuity.

Next steps in strategic planning involve discussions with partner organizations about their visions for the future. We welcome feedback from our neighbors and our broader community, and we remain committed to being a good partner to those working to conserve natural and cultural resources in the Missouri Ozarks. We hope to approve a completed plan at the board's January meeting and continue forward with implementation and will report more fully in our next annual report.



Left: Board members and staff during the 2019 strategic planning retreat in Salem. NEAL HUMKE
Right: Roger Still moderates the discussion during the strategic planning retreat. CLARE HOLDINGHAUS-IRELAND

REMEMBERING LEON CAMBRE

In July the foundation lost one of its longtime directors, Leon Cambre, who had served on L-A-D's board since 1997. Leon earned his degree in forest management at Mississippi State University in 1958 and then enjoyed a distinguished career with the US Forest Service, serving as a district ranger, forest entomologist, and as supervisor on several national forests, most notably Missouri's Mark Twain National Forest from 1979 through 1986.

During his tenure on the Mark Twain he oversaw the congressional designation of six of Missouri's eight federal wilderness areas and the completion of a forest management plan that included a commitment to apply uneven-aged management to more than ten percent of the forest and evaluate its effectiveness. This came during a time when the Forest Service nationally was relying almost completely on even-aged management by clearcutting, and Cambre began building cooperation with Pioneer Forest for the implementation of uneven-aged management on the Mark Twain. It was an effort that led by the early 1990s to federal funding for a series of research investigations on Pioneer Forest that demonstrated the efficacy of Pioneer's uneven-aged management system.

As an L-A-D board member Leon provided guiding influence in management planning for Pioneer Forest and sage advice on policy issues confronting the board. He accompanied board and staff in 2014 on a visit to the longleaf pine country of Georgia and Florida and was a long-standing member of the stewardship committee. We remember Leon with deep admiration and gratitude for his many years of dedicated service and friendship.



Above left: Leon and Terry Cunningham at a board meeting, 2008



Above center: Leon on a trip to see longleaf pine in Georgia, 2014



Above right: Leon and Ted Heisel examine a shortleaf pine on Pioneer Forest, 2009



Below left : Leon and Dan Skaggs at the Pioneer BBQ, 2009

Below center: John Karel and Leon on a tour of Jerktail Mountain, 2018

Below right: Left to right: Rindy O'Brien, Greg Iffrig, Clint Trammel, and Leon Cambre in the old L-A-D office, 2008



FORMER FOREST MANAGER CLINT TRAMMEL INDUCTED INTO THE MISSOURI CONSERVATION HALL OF FAME

In April 2019, the Missouri Department of Conservation (MDC) honored the late Clint Trammel in Salem by inducting him into the Missouri Conservation Hall of Fame. Clint was the longest-serving forest manager of Pioneer Forest from 1979 until 2007, having begun working there in 1970. He died in 2018 at age 78. The award is the highest honor of the Missouri Conservation Commission and was presented at Pioneer's annual BBQ on April 25 by Conservation Commission Chair Marilyn Bradford. MDC Director Sara Parker Pauley, Deputy Director Mike Hubbard, and State Forester Lisa Allen joined Bradford in presenting the award to the Trammel family. Clint is among 44 Missourians, including Leo Drey, who have been posthumously awarded this honor for substantial and lasting contributions to forestry, fisheries, and wildlife conservation efforts in the state.

Trammel was also honored during the ceremony with a bronze plaque from the L-A-D Foundation and the Missouri Consulting Foresters Association, of which he was a founding member and first president.

In her remarks, agency Director Pauley noted Clint's role in refining the forestry technique known as single-tree selection, a type of uneven-aged forest management. Director Pauley pointed out that after World War II, "as even-aged practices gained favor, it was against the odds that Trammel and Pioneer staff adhered to tradition, all the while continuing to monitor results from use of the method across the more than 150,000-acre forest." In time, she said, Clint was able to "see academic research confirm, and public and private foresters increasingly adopt, the techniques of uneven-aged management that he and his staff perfected and so openly demonstrated for decades."



The Missouri Department of Conservation presents the Trammel family with Clint's award. Left to right: MDC director Sara Parker Pauley, Conservation Commission Chair Marilyn Bradford, Clint's son Brad Trammel, Clint's daughter-in-law Jennifer Trammel, Clint's son Mike Trammel, and Clint's brother Gene Trammel. DENISE HENDERSON VAUGHN

JERRY VINEYARD HONORED AT BALL MILL TRAIL DEDICATION CEREMONY

The skies opened up in Perry County on March 29 but couldn't dampen the spirits or drown out the words of about 40 family, friends, and state and local officials gathered to celebrate Jerry Vineyard's many contributions to Missouri's collective knowledge of its geology and caves. The downpour postponed the unveiling of a bronze plaque on a granite boulder in his honor that sits on the trail to Ball Mill Resurgence but allowed extra time for stories about Jerry.

Vineyard was a founder of the Missouri Speleological Society (MSS) in 1956 and explored and mapped many Missouri caves. His 1963 master's thesis research at the University of Missouri used dye traces that established a hydrologic connection between Devils Well and Cave Spring on the Current River, an area owned by the L-A-D Foundation. Vineyard's long career at the Missouri Geological Survey from 1963 to 1997 culminated as deputy director. During that time he wrote or contributed to 54 publications, including *Springs of Missouri* (with Gerald L. Feder) and *Geologic Wonders and Curiosities of Missouri* (authored by Tom Beveridge). He served on the L-A-D board of directors from 1996-2016, and as emeritus board member until his death at 82 on March 31, 2017.

The Missouri Geological Survey's current deputy director Jerry Prewett said Jerry developed his fascination for geology while growing up in Dixon, attracted to the many caves in Pulaski County. Jerry's caving companion in his early years, Dr. Stan Sides of Cape Girardeau, told how he first caved with Jerry in 1960 at Devil's Icebox near Columbia. He said Jerry was very skinny then, well-suited for tiny underground passages, and the two explored and mapped Berome-Moore and other newly discovered Perry County caves during the '60s.

In 1978, Jerry persuaded Leo Drey to purchase the 19.6-acre tract containing Ball Mill, which soon after became a state-designated natural area. Greg Iffrig told of Jerry's enthusiasm for L-A-D Foundation and MDC acquisition of additional land, now totaling 560 acres, to buffer Ball Mill and the recharge area for Berome-Moore Cave with its federally endangered grotto sculpins.

Jerry also instigated the progress that Perryville has made in improving water quality in cave streams beneath the city, said Mayor Ken Baer, and others described their "extreme pleasure" working with him. His wife Helen summed it all up: "He believed in stewardship."



Top: Guests take shelter from the weather in a barn before the ceremony.

Middle: Chuck Romig talks about his family's history of farming the land in Perry County. The Romig family has worked with the L-A-D Foundation to protect the karst landscape, including cave resources Jerry helped map.

Bottom: Helen Vineyard shared her memories of Jerry's time working with Leo on cave protection and thanked all for helping to celebrate his life's work.

PHOTOS: CLARE HOLDINGHAUS-IRELAND

L-A-D WELCOMES ROGER STILL TO THE BOARD OF DIRECTORS



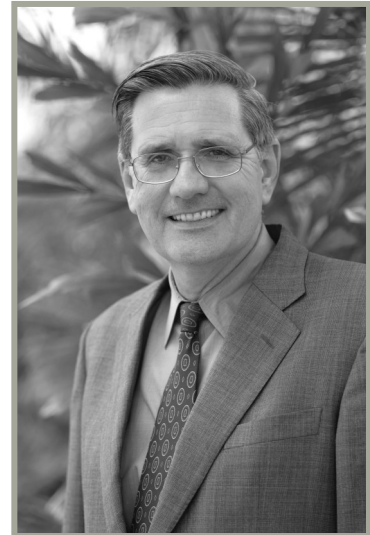
The L-A-D Foundation board was pleased to elect Roger Still to the board of directors at this year's fall board meeting after getting to know him through his facilitation of the early phases of the foundation's strategic planning. Roger is a Columbia resident who grew up in Lebanon, Missouri. He graduated from the University of Missouri-Columbia with a Master of Arts in History. His career has included work as a CIA Russian analyst, as a state director of the Nature Conservancy, then Audubon Missouri, before becoming vice president of the National Audubon Society responsible for all states and programs along the Mississippi River and its tributaries.

He was the founding director of the Community Foundation of Central Missouri and has worked as a consultant advising other non-profit organizations including the Bobolink Foundation, Roy and Patricia Disney Family Foundation, Patagonia, and Nature Conservancy of Florida. Beginning in 2011 he helped initiate the National Audubon Society Conservation Ranching Program and continues to assist in a market launch underway in the Midwest, and he is now a consultant for the innovative new Nature School for Columbia and Boone County. We welcome Roger and look forward to working more with him.

JOHN KAREL INDUCTED INTO MISSOURI RECREATION AND PARKS HALL OF FAME

On February 27, at the awards banquet during the 2019 Missouri Parks and Recreation Association (MPRA) Conference and Expo in Branson, John Karel was inducted into the Missouri Recreation and Parks Hall of Fame. He was recognized as one of the most accomplished parks professionals in the history of the state. "His vision, passion, perseverance, and love of history have literally changed the landscape of Missouri," the citation read. In this signal honor, he now joins Leo Drey.

Among his accomplishments are serving as the state park system's first director of natural history, developing an outstanding stewardship and ecological restoration program, and bringing state parks into partnership with the conservation department in administering the Missouri Natural Areas System. He served six years under three governors as director of Missouri State Parks, during which he brought the park system back from a major financial crisis by positioning it to benefit from a state bond issue and the innovative Parks and Soils Sales Tax, laying the groundwork for the renaissance of the system to national prominence. As a volunteer, he also skillfully led in promoting four separate acts in the U.S. Congress resulting in eight federal wilderness areas in Missouri.



Then during 28 years as director of Tower Grove Park in St. Louis he not only led the revitalization of the park and restoration of many Victorian-era structures and natural and cultural landscapes but, gained national recognition for the park and in the process had a significant impact on the revitalization of neighborhoods surrounding the park. John was also recognized for his service to the L-A-D Foundation, serving 18 years as its president and guiding its transition to a major private operating foundation following the gift of Pioneer Forest from Leo and Kay Drey in 2004. In his spare time he has restored three historic buildings, and continues to inspire his neighbors and colleagues.

Our admiration and hearty congratulations!

WAYNE GOODE HONORED WITH THOMAS JEFFERSON AWARD

L-A-D board member Wayne Goode was honored this year by the Missouri Historical Society for his long history of public service in Missouri and for his work addressing environmental issues across the region. He received the society's highest honor, the Thomas Jefferson Award, which was presented at the society's annual dinner on November 7.

The principal speaker for the presentation was Bob Priddy, noted Missouri newsman and historian, who covered the legislature and all of state government for Missouri from 1974-2014 and always kept a close watch on as consequential a leader as Wayne Goode. Wayne's 42-year legislative career began when he won election to the Missouri House of Representatives in 1962 at age 25. During his tenure in the Missouri statehouse, Goode crafted the bill that led to establishment of the University of Missouri-St. Louis, spearheaded many pieces of environmental legislation, helped to establish the Katy Trail, and became known for his keen eye and fiscal prowess as chair of the House Appropriations Committee. After his election to the Senate in 1984, he rose to chair of the Senate Budget Committee. When Wayne term-limited as senator, he continued as chair of the Missouri State Capitol Commission and worked even more closely with Priddy, who was deeply involved in researching and creating the monumental *Art of the Missouri Capitol* sponsored by Wayne's commission and for which Wayne wrote the foreword.



Beyond his work in government, Wayne was a cofounder of Trailnet, helping to improve the bikeability of St. Louis, and a longtime director and officer of the L-A-D Foundation, the Missouri Foundation for Health, Great Rivers Environmental Law Center, the University of Missouri Board of Curators, and the Missouri Historical Society. Across all these areas of service, Priddy commended Wayne on his utter integrity, statesmanship, and ability to work across the aisle for the good of all Missourians.

Wayne was also honored during a University for a Day event at the Missouri History Museum on October 25, with his fellow L-A-D director and friend Steve Mahfood as emcee. The event featured an address by Dr. Peter Raven and leaders of St. Louis nonprofits discussing trail connections, greenspace, environmental issues, and public health—all issues to which Wayne devotes enormous energy and leadership acumen as a more than full time volunteer.

An environmental and historical bike ride was also held in Wayne's honor, a nod to his longtime enthusiasm for cycling and his intimate knowledge of St. Louis. The tour was led by Wayne's son Peter, but Wayne was there to offer his insights at the key stops.

Our deepest gratitude and heartfelt congratulations to Wayne on this recognition.

Left: A panel of St. Louis-area leaders discusses greenspace issues as part of the University for a Day event at the Missouri History Museum.
Right: Steve Mahfood (left) introduces Dr. Peter Raven (right) at the University for a Day event.
PHOTOS: CLARE HOLDINGHAUS-IRELAND



LEO AND KAY DREY AND STEVE MAHFOOD HONORED BY MCE

The Missouri Coalition for the Environment celebrated its 50th anniversary with a gala at the Missouri Botanical Garden on November 2. As the highlight of that event, L-A-D Foundation founders Leo and Kay Drey and Steve Mahfood were honored by MCE with the presentation of MCE's first lifetime achievement awards. Each was introduced by a sprightly video full of historical photos, followed by remarks and presentation by longtime friends — former MCE Executive Director Ben Senturia for the Dreys and Peter Raven and Sara Parker Pauley for Mahfood — and heartwarming responses from Kay and Steve.

Leo was commended for his role as co-founder and leader of MCE and many other Missouri environmental and forestry organizations, for his leadership in establishment of the Ozark National Scenic Riverways, for pioneering sustainable forestry practices in the Ozarks, and for preserving other areas of cultural and ecological significance, especially the 7,000-acre Greer Spring tract now part of the Eleven Point National Scenic River. Kay was recognized for her early advocacy for civil rights, for her extraordinary leadership for nearly a half century on nuclear power and waste disposal issues (driven by her concern for public health) and keeper of the historical record for all things nuclear, and for her efforts to foster environmental education and protect greenspace in the St. Louis region. Both were honored for donating Pioneer Forest to the L-A-D Foundation in 2004, a gift that secured protection in perpetuity for nearly 150,000 acres in Missouri open for non-motorized public recreation.

L-A-D board member Steve Mahfood was recognized for his long and varied career spanning many decades of public service devoted to environmental quality at state, national, and international levels, including as director of the Missouri Department of Natural Resources (MoDNR). He began his career with the East-West Gateway Coordinating Council and the St. Louis County Health Department, then for several years was environmental director for CARE in North Africa and the Middle East, then back to the Missouri Division of Health and east to the Blue Ridge Mountains to manage a park. During his time with MoDNR — 14 years as director of the Environmental Improvement and Energy Resources Authority and seven as MoDNR director — Steve fought to improve air and water quality for all Missourians, served on numerous state and national boards, and worked with Leo Drey to integrate the trails of the Roger Pryor Pioneer Backcountry into the Missouri State Park system.

The L-A-D Foundation extends our warm congratulations on these highly deserved honors.



Left: Kay Drey was honored for her lifelong advocacy efforts in the presence of friends, family, and her many admirers.
Right: Steve Mahfood accepts his lifetime achievement award at the MCE gala.
PHOTOS: JOHN MONTRE, MCE

LEVI BACHMANN JOINS PIONEER FOREST STAFF



Levi Bachmann started as a forester with Pioneer in March 2019. Before joining the Pioneer staff, Levi attended the School of Natural Resources at the University of Missouri Columbia where he served as the president of the Mizzou Forestry Club and the School of Natural Resources Student Council. Levi also worked as a Forest Ecology and a Dendrology teaching assistant. After graduating with bachelor's degrees in fisheries and wildlife and forestry in 2017, Levi worked on feral hog issues with the USDA's Animal and Plant Health Inspection Service (APHIS). In addition to overseeing timber sales, Levi assists with Pioneer's efforts to eradicate feral hogs on the forest. He is based out of the Salem office.

NANCY THOMPSON JOINS L-A-D STAFF



The L-A-D Foundation welcomed Nancy Thompson as the foundation's first office and outreach assistant in April 2019. She joins L-A-D after a long, successful career working on greenspace and community development issues in the St. Louis region and beyond. She received her BA in English with additional work in journalism from the University of Missouri Columbia and a master's in urban and regional planning from the University of Illinois at Urbana-Champaign. Nancy started her career working in planning and community development across Missouri and in Lafayette, LA and Fort Pierce, FL. Most recently, Nancy served as a project manager, then community outreach manager, for Great Rivers Greenway from 2003 to 2013, then as executive director of the St. Louis Association of Community Organizations from 2013 to 2016. She describes herself as a "failed retiree," who is looking

to continue working with nonprofits in a part-time capacity. Since starting in April, Nancy has taken on updating and managing the foundation's website, monitoring social media accounts, editing publications, and assisting with all aspects of administration in the St. Louis office.

MATT SKAGGS RETURNS TO PIONEER FOREST



Matt Skaggs left Pioneer Forest in December 2018 to pursue a career as a manager at a local feed store cooperative. After nine months as the general manager of the feed store, he decided to leave his position there. Senior staff offered him a position back with Pioneer Forest, and he began in August 2019. A Bunker native and third generation of the Skaggs family to work for Pioneer Forest, his return has been very welcomed.

Shortly after his return, Matt was promoted to field supervisor for Pioneer. He is responsible for directly assisting the chief forester and helping to oversee the field operations of the forest. Matt is a strong leader and excellent communicator; having him in this role has helped to balance the workload for the senior staff.

CLAY JENSEN JOINS PIONEER FOREST



Clay Jensen with Pioneer Forest's co-champion butternut tree, 2019. BRANDON KUHN

Clay Jensen, a senior at University of Missouri, completed a three-month internship with Pioneer Forest in the summer of 2019. The internship took the place of the summer field studies program at the university. Dr. Ben Knapp, associate professor of silviculture at the University of Missouri, administered the internship, which enabled Clay to receive college credit for his efforts. Clay was supervised by the forest manager and chief forester and spent time in the field with each of the Pioneer staff. He learned about and applied the uneven-aged single tree selection method, helped administer timber sales, conducted forest inventories and trapped and removed feral hogs, among many other tasks.

Clay made a strong impression on everyone at Pioneer Forest, prompting senior staff to offer him a full time forester position upon his graduation. In December, Clay received a BS in Natural Resource Management with an emphasis in Forestry. He will begin his employment with Pioneer Forest in January of 2020. Clay will live near Piedmont, Missouri and will work mostly in the Ellington District.

REMEMBERING JERRY SUGERMAN



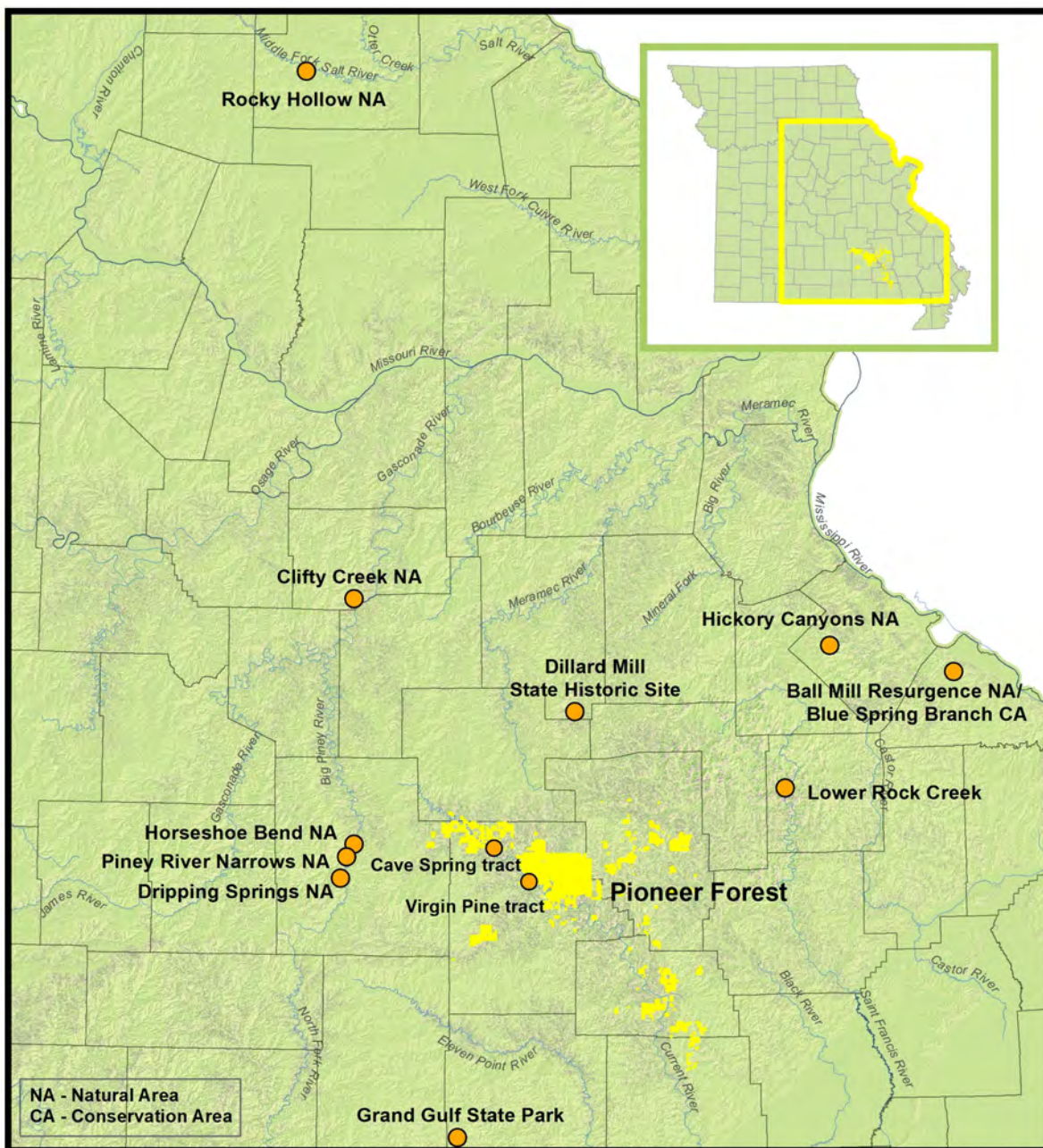
Jerry Sugerman.
UNIVERSITY CITY SCHOOL DISTRICT

Jerry Sugerman was passionate about Missouri rivers. He floated them and worked with individuals and organizations to protect them. He worked for many years during the 1970s to successfully prevent a dam from being built on the Meramec River. In 1978 state legislators agreed to a non-binding referendum through which the majority of voters favored leaving the Meramec as a free-flowing stream. In 1980 the dam project was de-authorized. Later he worked with the Ozark Land Trust to analyze and attempt to gain better easement enforcement along the Meramec.

More recently during the 2010s Jerry researched and mapped the points of motorized access and non-designated equestrian crossings along the Current and Jacks Fork Rivers as the National Park Service (NPS) was developing a new management plan for the Ozark National Scenic Riverways. He documented many more sites and crossings than even the NPS had acknowledged, which encouraged more attention from top National Park Service leadership and a broader conversation about improving protection for America's first national river park. Jerry died in August at age 78.

Appendices

MAP OF L-A-D FOUNDATION LANDS



LIST OF L-A-D FOUNDATION LANDS

PIONEER FOREST AND ITS SPECIAL AREAS

143,988.25 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	64.75 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	1003 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	58.4 acres

Continued on next page.

Continued from previous page.

<u>SPECIAL AREA</u>	<u>COUNTY</u>	<u>SPECIAL DESIGNATION</u>	
RIVERWAYS CORRIDOR LANDS			1,123.55 ACRES
Scenic Easements	Shannon, Carter	National Park Service, Ozark National Scenic Riverways, 1970	951 acres
Cave Spring	Shannon	Adjacent to the Current River	172.55 acres
LANDS LEASED TO THE MISSOURI DEPARTMENT OF CONSERVATION (MDC)			2,420.9 ACRES
Ball Mill Resurgence	Perry	State Natural Area, 1979, 19.61 acres; addition of 183.2 acres in 2007; addition of 77 acres in 2012; addition of 86.16 acres in 2018 Total acres under lease	365.97 acres
Clifty Creek	Maries	State Natural Area, 1971 Total acres under lease	230 acres
Dripping Springs	Texas	State Natural Area, 1973 Total acres under lease	8.59 acres
Hickory Canyons	Ste. Genevieve	State Natural Area, 1973, 420 acres; addition of 560.91 acres in 1979; addition of 18.68 acres in 2013; addition of 94.75 acres in 2014; addition of 40 acres in 2016; Total acres under lease	1,134.34 acres
Horseshoe Bend	Texas	State Natural Area, 1973, 69 acres Total acres under lease	233 acres
Piney River Narrows	Texas	State Natural Area, 1971, 50 acres Total acres under lease	258 acres
Rocky Hollow	Monroe	State Natural Area, 1973, 188 acres; National Register of Historic Places, 1974; Total acres under lease	191 acres
LANDS LEASED TO MISSOURI DEPARTMENT OF NATURAL RESOURCES			289 ACRES⁵
Dillard Mill	Crawford	State Historic Site, 1977	130 acres
Grand Gulf State Park	Oregon	National Natural Landmark, ⁶ 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	
OTHER LANDS			267.42 ACRES
Lower Rock Creek	Madison	Wild land	226 acres
Virgin Pine	Shannon	Scenic remnant corridor	41.42 acres
TOTAL L-A-D FOUNDATION LAND OWNERSHIP			148,089.15 ACRES

Footnotes on next page.

Footnotes from pages 50-51:

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.

⁵State 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; the lands of the Roger Pryor Backcountry are part of Pioneer Forest and are included in its acreage at the top of page 41.

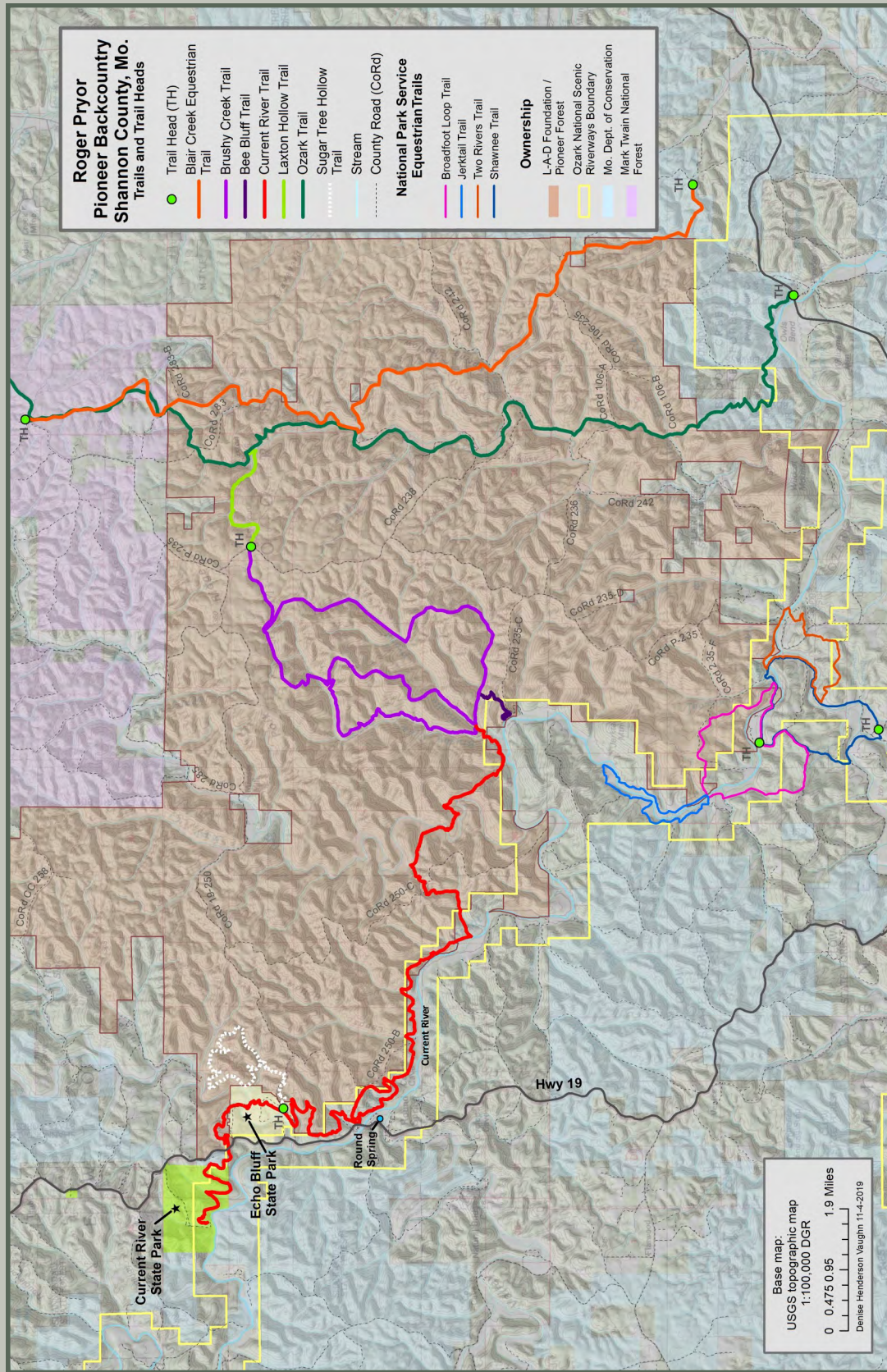
⁶The National Natural Landmarks program is administered by the National Park Service. Grand Gulf is among fewer than 600 sites designated in the United States.

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 one-mile interpretive walk south of Round Spring leads through an old shortleaf pine stand where several trees are aged at more than 200 years.

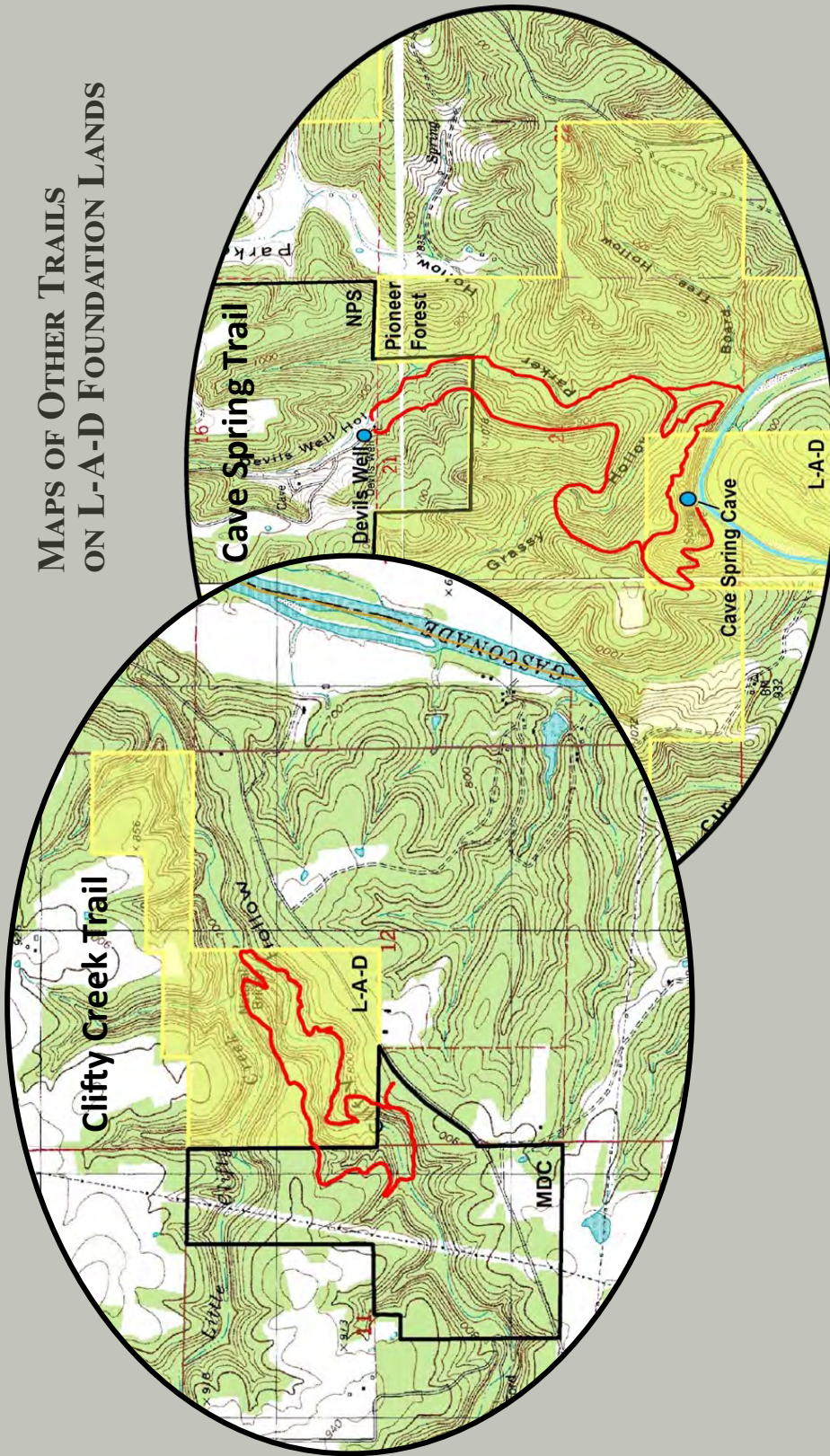
NOTE: The NPS Ozark National Scenic Riverways equestrian trails are shown on the south side of the Backcountry map (see next page). The Broadfoot Equestrian Loop Trail shown in purple connects riders between Griggs Ford and the Broadfoot Ford. A small piece of Two Rivers Equestrian Trail crosses Pioneer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

MAP OF THE TRAILS OF THE ROGER PRYOR PIONEER BACKCOUNTRY



For access to a digital map or to review a larger image go to: <https://ladfoundation.org/pioneer-forest/roger-pryor-pioneer-backcountry/>

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



The Clifty Creek Trail (above 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 right) in Shannon County begins on Ozark National Scenic Riverways land and continues across the Foundation's Pioneer Forest to Cave Spring at the Current River. It is 4.6 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. An inventory repeated with regular frequency, over a long time period, to locate and estimate quantities by species, product, size, quality, and other characteristics.

CFM – Conservation Federation of Missouri.

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.

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 of 60 to over 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 refuge, such as a cave, where animals, such as bats, will hibernate during 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.

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, 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.

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 – 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 2020

Between 1996 and 2006, the staff of Pioneer Forest prepared an Annual Report to the Foundation 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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