



**L-A-D FOUNDATION**

Since 1962

*Celebrating 50 Years of  
Wild and Scenic Rivers*

**2018 Annual Report**





**A NOTE ON L-A-D FOUNDATION ANNUAL REPORTS:** In the past, the L-A-D Foundation Annual Report was published in the fall, with the most recent published in October 2017. Starting now and continuing into the future, we will publish after the first of the year in order to include a full calendar year's news. For this issue only, we are covering the period from October 2017 through December 2018.

**COVER PHOTO:** A view of early spring greenery on the Eleven Point River with the Irish Wilderness beyond. The year 2018 marks the 50th anniversary of the National Wild and Scenic Rivers Act, which preserved certain rivers of “outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.” The Eleven Point River in Oregon County was one of the first rivers to be designated under this act, and it remains a unique and beautiful area to this day.

L-A-D Foundation founder Leo A. Drey was instrumental in shaping the Wild and Scenic Rivers System here in Missouri and nationwide. He was deeply involved in efforts to protect the Current, Jacks Fork, and Eleven Point Rivers as free-flowing streams by Congressional authorization of the Ozark National Scenic Riverways in 1964, which served as a prototype for the National Wild and Scenic Rivers Act. In 1965, he was named by Gov. Warren Hearnes as a member of the Missouri Wild Rivers Advisory Committee and remained engaged with river issues his entire life. In 1988, Leo acquired the 7,000-acre Greer Spring tract along the Eleven Point River to save the pristine spring from a commercial bottled water plant, then transferred it to the U.S. Forest Service in 1993, allowing for its continued protection as part of the scenic river corridor. This year is the 30th anniversary of Leo's purchase, and Greer Spring and Greer Mill remain focal points of this special river.



*Leo Drey (front right) leads U.S. Senators Alan Bible, Frank Moss, and Ed Long and others on a tour, 1962.*



*Leo Drey at Greer Spring, 1988.*

**COVER PHOTO: DAN ZARLENGA, 2018**



# ANNUAL REPORT

## *of the L-A-D Foundation*

*January 2019*

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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.

**PHOTOGRAPHS AND IMAGES:** Photo and image credit information used in this report is found with each image; all are printed from digital files, and those not originating with the Foundation have been given to us for our use and are reproduced here with permission. Maps were produced by Denise Henderson Vaughn using ArcGIS software from ESRI and digital map files of Missouri, U.S. Geological Survey topographic maps, and aerial photos from the National Agricultural Imaging Project (NAIP).



# 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

Since the L-A-D Foundation's last annual report (October 2017), John Karel stepped down as an officer after eighteen years as president and remains active as a board member. On behalf of everyone associated with the Foundation—board, staff, and advisory councils—we acknowledge with profound gratitude his many years of thoughtful and successful guidance as the Foundation has grown and greatly expanded and strengthened its operations.

We pay tribute in this report to Missouri's Eleven Point National Scenic River, an original unit of the National Wild and Scenic Rivers System, both of which celebrated their 50th anniversaries in 2018. We have long-standing interest in the Eleven Point River and its watershed, especially in Oregon County, as a result of conservation advocacy efforts and property investments of founder Leo Drey, including his effort to protect the 7,000-acre Greer Spring tract.

On our working forest, the big effort this past 15 months has been our once every five years measurement and initial analysis of our Continuous Forest Inventory, this time with new laser technology that allows for the most accurate assessment of volume we have ever had. It provides much food for thought for upcoming management planning.

You will also see in this year's report the successful work we have been doing with our partners at the Missouri Conservation Department and others in Perry County, adding more protected land and restoring the grassland and savanna of this important karst landscape. Our L-A-D seasonal stewardship crews have also been working on control and eradication of invasive species, both in our Ball Mill Natural Area in Perry County and on Pioneer Forest, and preparing for and conducting prescribed burns in special ecological areas on the forest. And volunteers from Sierra Club and the Ozark Trail Association completed the long-awaited Current River Trail from Brushy Creek to Round Spring.

We recently welcomed two new members to the Foundation's board of directors, Janet Fraley from Houston in Texas County and Rebecca Landewe from Van Buren. We look forward to their counsel as we continue to contribute to local economies and improve the forests and woodlands of the Eastern Ozarks in which we work and they live.

This year, sadly, we unexpectedly lost Clint Trammel, who was chief forester, then served admirably for 29 eventful years as Pioneer Forest manager during a critical and trying time in the forestry profession. After his 2007 retirement, he served on the Foundation's Advisory Council. We happily report that the Missouri Conservation Commission recently approved his nomination for its highest honor, induction into the Missouri Conservation Hall of Fame. We plan to celebrate Clint's life and legacy at this year's spring BBQ April 25 with his family and many with whom he worked.

We look forward to meeting and working with more of you in 2019.

Sincerely,



Susan Flader  
President



# L-A-D FOUNDATION

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

## Pioneer Forest Management



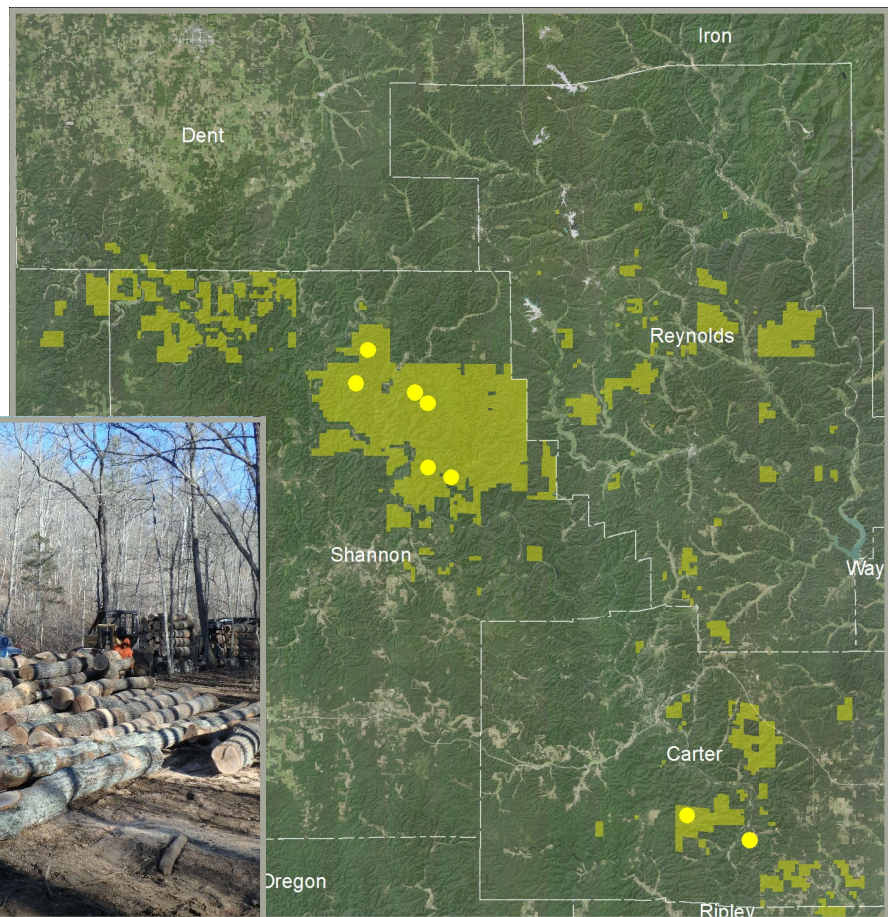
Advisory Council members  
discuss a recent harvest.  
CLARE HOLDINGHAUS-IRELAND

### TIMBER SALES

Pioneer Forest had seven timber sale contracts active for nearly all of 2018 and added another timber sale last summer. Staff added a salvage timber sale this fall for some relatively minor cleanup of dead and dying red oak. The timber harvest for 2018 included 8.2 million board feet of sawtimber. In addition, 3.8 million board feet of blocking and 400,000 board feet of stave quality white oak were sold. The timber sales consisting of marked live timber covered 4,213 acres.



Log landing on a timber harvest. RICK THOM



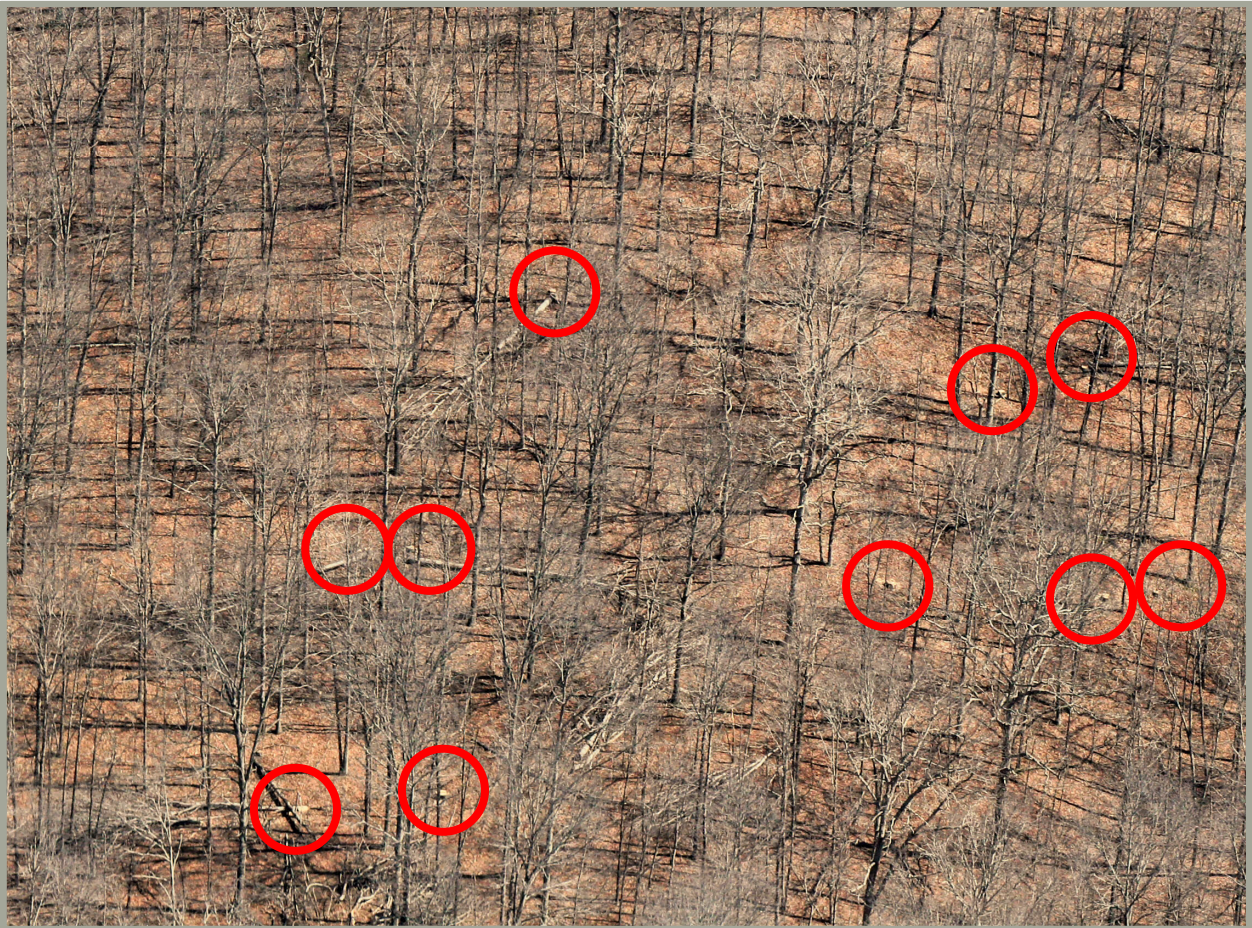
Locations of 2018 timber sales on Pioneer Forest.



## MANAGING LIGHT THROUGH THE FREQUENCY OF TIMBER HARVEST

Harvesting creates canopy gaps which maintain the irregular but constant provision of direct light to the forest floor and which are critical to Pioneer's success. Light penetrates the canopy through these gaps where one or more trees have been removed and promotes the regeneration of seedlings on the forest floor. Over time these gaps slowly fill in. Periodic entry creating new canopy gaps results in a shift of these openings in space and time and continually influences the development and maintenance of the forest structure on Pioneer land.

The length of time between each harvest becomes one of the most important aspects of successful, long-term management. A harvest schedule is developed based on the date of the last harvest and Pioneer's preferred 20-year re-entry period. Harvests currently underway have been overdue; some lands were last harvested more than 30 years ago. Pioneer Forest staff has been working diligently to re-establish the 20-year re-entry period by increasing the acres harvested each year from the current average of 5000 acres to an estimated 7000 acres.



*An estimated one acre of Pioneer Forest with red circles showing stumps where marked trees have been cut creating gaps in the canopy.*  
DALE DUFFER



## PIONEER OBSERVES CERTIFICATION FOR CONSERVATION LANDS

The forest management practices of the Missouri Department of Conservation (MDC) were recently certified by the Sustainable Forest Initiative (SFI), which provides a national standard for verification of sustainable practices and product chains of custody. Jason Green, Pioneer Forest's manager, was invited to join in the annual SFI surveillance audit of state forest lands in September 2018. He was impressed by the process and appreciated the impact that such a large acreage of forest land would have on certified products in Missouri. The state's participation in certification is certain to bring others into the program.

In 2003 Pioneer Forest was an early adopter of this concept and was certified under the international guidelines of the Forest Stewardship Council, at that time considered the most stringent program. Pioneer maintained its certification for ten years before withdrawing in November 2012 because the program proved to be too time-consuming and expensive to continue without an adequate market for certified products. Although deciding not to continue participating, Pioneer has always remained committed to the concept.

Pioneer Forest is among the biggest suppliers of white oak for stave bolts for Independent Stave Company, headquartered in Lebanon, Missouri. This global company, which manufactures oak barrels for the wine and liquor industries, is interested in the benefits of SFI certification for their business. With the increased interest in certification from both state and private sectors, the L-A-D board may take up the issue of forest certification again in the near future.



*Barrels made from white oak. INDEPENDENT STAVE COMPANY*

## BOUNDARY LINES

Pioneer Forest has more than 577 miles of boundary lines. Maintaining these lines is a top priority for forest staff, who conduct continuous maintenance on these lines, painting roughly 125 miles per year. With the measurement of the CFI occurring every 5 years, this puts each boundary line on a six-year rotation. Since 2013 staff have painted over 446 miles of boundary line. The goal for winter 2018-2019 is to complete just over 131 miles, located primarily in the Grandin and Leatherwood creek areas of the forest. As of January 2019, 82 miles have been painted.

## WOODLAND BIRD WORKSHOP

Brad Jacobs, retired state ornithologist and wildlife biologist from the Missouri Department of Conservation, conducted a workshop for Pioneer Forest staff this past May. The workshop focused on discussing the importance of forest interior, riparian areas, open woodland, and glades to tropical migrant species and on showing how Pioneer management affects both local and migratory species. Staff members were guided in field identification by sight and sound, with assistance from board member Rick Thom. An indoor presentation illustrated bird migration range, monitoring techniques, and eBird reporting.



*Brad Jacobs, left, teaches Pioneer staff about migratory birds. NEAL HUMKE*



# L-A-D FOUNDATION

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**LAND CONSOLIDATION**  
RESEARCH  
STEWARDSHIP AND RECREATION  
OUTREACH AND EDUCATION  
GRANTMAKING AND COMMUNITY SUPPORT  
PUBLIC POLICY  
ADMINISTRATION

## Land Consolidation



*Sinkhole pond on Romig property.*  
GREG IFFRIG

### L-A-D FOUNDATION ADDS TO ITS PERRY COUNTY KARST PROPERTY

The Foundation's 19.7-acre Ball Mill Resurgence Natural Area was acquired by Leo Drey in 1978. Beginning in 2007 the L-A-D Foundation acquired a wooded portion of the adjacent Shafer tract as a buffer which included significant streamside protection along Blue Spring Branch. That began a series of five land transactions establishing our current ownership of 367 acres in Perry County. The Foundation donates a lease of these lands to the Missouri Department of Conservation for management as the Blue Spring Branch Conservation Area. This small but important piece of the unique Perry County karst region provides for public education, wildlife observation, nature study, and outdoor recreation including hunting.

This year the Foundation acquired an adjoining 88.58 acres from its neighbors, the Romig family, extending its ownership farther south on the karst plain overlying Keyhole Spring and Ball Mill underground recharge areas.

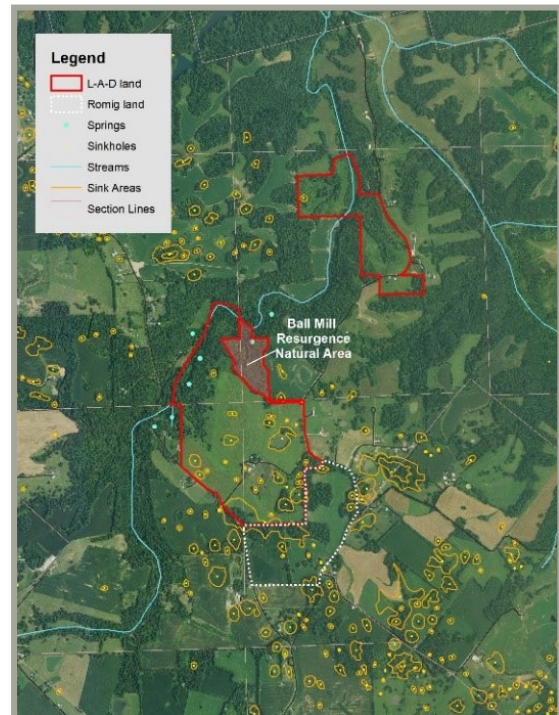
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*Above: The Romig property contains high-quality wetland areas.*

*Right: L-A-D Foundation land in Perry County, outlined in red, with the Romig addition outlined by dashed white line. The many sinkholes throughout the region are highlighted in yellow. The Romig acquisition is a mix of wooded and open areas following the natural contours of the landscape. See also the photograph on page 8.*

PHOTO: GREG IFFRIG



**Endangered Species Protection.** In a state known as the Cave State, Perry County has both the greatest number of recorded caves and the longest caves in Missouri. The federally endangered grotto sculpin (*Cottus specus*) occurs here in five cave systems, and nowhere else in the world. This species has been consistently reported from the surface of Blue Spring Branch and underground from the associated Berome Moore cave system.

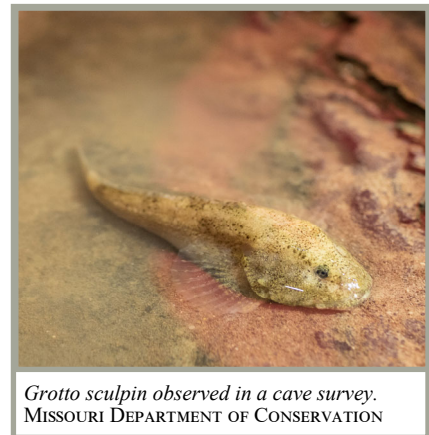
**Vintage Farming.** Beginning in 1927 three generations of the Romig-Fairchild family established conservation-minded agricultural practices in the heart of this area. Sinkholes have been protected, there are no vertical drains, and row crops have been contoured around important natural features for decades. The matrix of farmed fields and natural lands include more than a dozen sinkholes and sinkhole ponds; many are surrounded by generous woodland buffers, while others stand alone as wooded islands. Contractors farming the Romig land have used modern equipment, but the result appears to maintain a vintage style of farming.



**Conservation Partners.** In November of 2017, after the death of their mother, the four Romig siblings became owners of an undivided interest in the property. They notified the L-A-D Foundation that they wished to give conservation partners a chance to purchase all or part of their property. Each of the siblings was aware of the value of the land from an ecological and research perspective and appreciated that it was likely to benefit the endangered grotto sculpin. At the request of their parents they sought long-term stewardship and public enjoyment for this significant piece of the karst landscape that had been so loved by their family.

The Romig property now joins the other conservation lands in Perry County, managed in partnership by the L-A-D Foundation and the Missouri Department of Conservation. Recently a larger group of local, state, and federal organizations developed an unusually effective partnership in support of the recovery of the grotto sculpin. Their work to improve underground water quality, educate landowners, clean up sinkholes, and protect karst resources regionwide is supported by contributions from the Cave Research Foundation, the Missouri Department of Natural Resources, the Missouri Speleological Survey, the Southeast Missouri Regional Planning Commission, the University of Missouri Extension, the U.S. Fish and Wildlife Service, and the USDA Natural Resources Conservation Service.

At its December meeting, the Missouri Conservation Commission approved acquisition of the remaining 192 acres of Romig land adjoining the L-A-D Foundation purchase. Together with the Foundation's other land in the area, this brings more than 550 acres under conservation management, further improving the natural integrity above and below ground in this karst region of the Perry County.

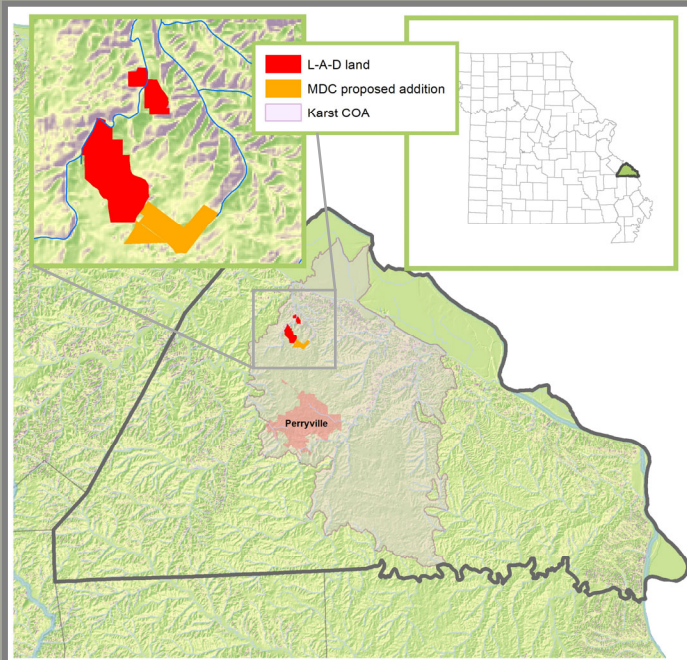


Grotto sculpin observed in a cave survey.  
MISSOURI DEPARTMENT OF CONSERVATION



## RESTORING PRAIRIE ON THE PERRY COUNTY KARST PLAIN

Shown on the map below is the location of Foundation lands within MDC's Cave and Karst Conservation Opportunity Area (COA) in Perry County. Ball Mill Resurgence Natural Area and Blue Spring Branch Conservation Area lie south of St. Louis along the upland adjacent to the Mississippi River.



Prairie on the Perry County karst plain consists of rich, dark brown Menfro silt loam, with the subsoil extending 60 inches or more in depth. Historically, the region was characterized by a rolling upland of savanna with native grasses and forbs amid thousands of sinkholes that formed in the underlying limestone bedrock. Staff of Missouri Department of Conservation began slowly converting crop fields back to native plants on the L-A-D lands they lease. The success from seeding and periodic prescribed fire shows along the mown trails through the grasslands, within a small savanna area with wide-spreading post oak and white oak, and in the woodlands leading down to the Blue Spring Branch. From left to right: cup plant (*Silphium perfoliatum*), Maximilian sunflower (*Helianthus maximiliani*), and butterfly gaura (*Gaura biennis*). PHOTOS: GREG IFFRIG

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ADMINISTRATION

*Research*



*Botanical inventory conducted on the Randolph Tract.*  
NEAL HUMKE

### PIONEER FOREST CONTINUOUS FOREST INVENTORY

The 14th Continuous Forest Inventory (CFI) began in September of 2017. The CFI was designed to track long-term changes and trends in timber growth within Pioneer Forest and continues to be the major resource for planning future forest management. Pioneer Forest staff measured 448 1/5-acre plots and more than 14,000 individual trees. This inventory marked the first use of sophisticated new measurement tools and techniques, including the use of laser calipers for measuring small-end diameters and laser clinometers for estimating merchantable tree heights. These two tools were critical for obtaining more accurate merchantable heights, and therefore accurate tree volume estimates. (See the following article on the history of the Pioneer CFI for more information.)

In past measurements, staff had used hand-built calipers on bamboo poles to measure tree heights to merchantable upper stem diameter. These worked relatively well but were difficult to carry in the field and problematic on trees that were very tall. Over time, staff depended less and less on these tools as they used their long experience in the field visually to estimate the merchantable heights of the trees. The move to advanced laser equipment has resulted in the most accurate inventory to date.



*Chief Forester Brandon Kuhn and Forester Dustin Collier measure trees during the 2017 CFI.*  
JASON GREEN

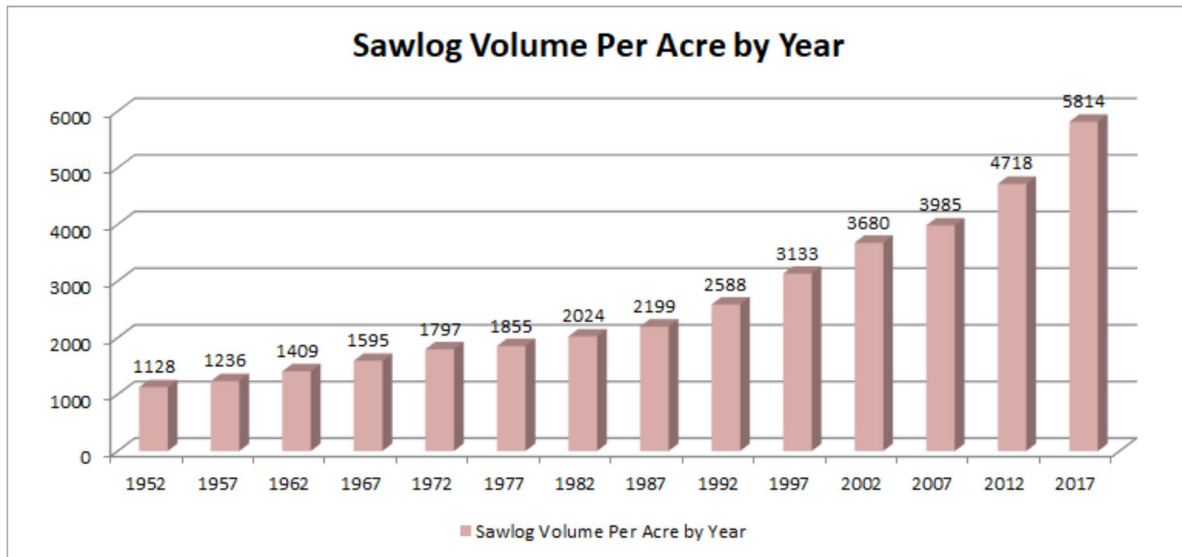
**The Problem of Old Tree Heights.** Tree heights in the 2012 inventory, based on visual estimates, are now shown to have been, as a whole, underestimated. This caused what appeared to be dramatic increases in standing volume and growth from 2012 to 2017. Since most forest planning is based on the CFI, accurate data were needed to predict standing volume and growth from one measurement to the next. With advice and help from L-A-D Advisory Council foresters David Larsen and Jim Guldin, we were also able to use known tree diameters at breast height (dbh) from the 2012 and 2017 CFIs with laser-derived merchantable heights of individual trees from the 2017 CFI and the ratios of dbh to merchantable height in 2017 to more accurately estimate the heights of individual trees in the 2012 CFI and thereby develop a more accurate estimation of standing volume in 2012.

*Continued on next page*



**Results of the 2017 CFI.** The results of the CFI are presented with the best available information. Growth and standing volume are estimates that use actual dbh and height measurements from 2017 and compare those values to the 2012 measured dbh and adjusted merchantable heights. It is the best available method for making comparisons between the 2012 inventory and the 2017 inventory.

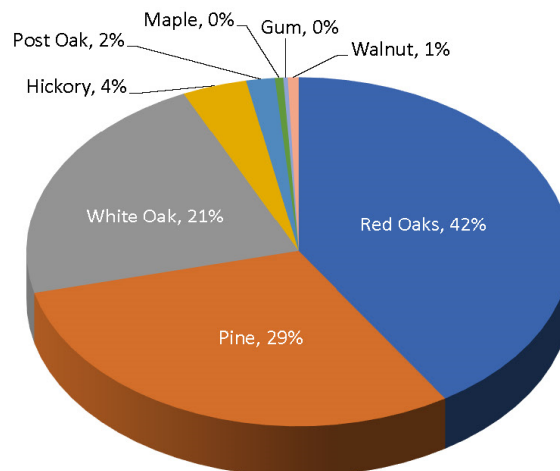
**Volume Per Acre.** As expected, forest volume significantly increased from the last measurement period. Our standing volume for the 2017 inventory was 5814 board feet per acre (bf/ac). This is an increase of 1096 bf/per acre and represents a 23% increase in standing volume when compared with the 2012 adjusted inventory (4718bf/acre in 2012).



Pioneer Forest's standing volume has continued to increase over time. In fact, the volume has increased over every measurement period to date. The number of sawlog trees per acre on the forest has also increased to 43.0 in 2017 compared with 40.6 in 2012. This is also the highest number of sawlogs per acre in the history of Pioneer Forest.

Composition of merchantable species by volume is relatively unchanged from 2012 to 2017. Red oak species continue to make up most of the standing volume followed by shortleaf pine and white oak. These three categories make up over 90 percent of the total standing volume of the forest.

### Species Composition by Volume 2017



## THE HISTORY OF THE PIONEER FOREST CFI

**A Brief Historical Overview.** In 1952, Pioneer foresters Ed Woods and Charlie Kirk (then employed by National Distillers Products Corp.) sought assistance from Calvin B. Stott (often referred to as the “Father of CFI”), who had begun developing the Continuous Forest Inventory methodology for the U.S. Forest Service in the 1930s (Stott 1968). Woods and Kirk established the CFI system of forest measurement on Distillers’ lands starting in 1952. Two years later, these lands, some 90,000 acres mostly in Shannon County, were purchased by Leo Drey.

The 1952 CFI had 132 permanent 0.2-acre (0.08 hectare) plots, one for each 640-acre (259 hectare) section of the forest. These circular plots were located systematically in the center of every sixteenth 40-acre parcel of ownership, counting from the northwest section corner.

In 1957, Leo Drey resolved to repeat the inventory every five years on his entire holdings of Pioneer Forest, then nearly 135,000 acres in six counties, with 0.2-acre sample plots to represent each 320 acres. For lands measured in 1952, one additional plot for each section was established 5 chains (330 feet) north of the original plot. For new lands added to the CFI, the plot locations were in similar pairs 5 chains apart, for a total of 384 plots in 1957. The total number of plots would increase as the acquisition of land continued. Stott helped set up a complex, 152-step system to track some 12,000 individual trees with a dbh (diameter at breast height) greater than 5 inches. Data was entered on IBM punch cards processed by a new computer at the Ford Forestry Center in L’Anse, MI.

During 1992-1997, with help from the University of Missouri and the USDA Forest Service North Central Forest Experiment Station, the Pioneer Forest inventory of the 0.2-acre plots was expanded to include all saplings greater than 1.5” dbh. Within a subset of 100 plots, smaller 1/50-acre plots were established for a count of smaller saplings and tree seedling regeneration less than 1.5” dbh.

**Maintaining and Measuring Plots.** When Pioneer Forest holdings are sold, measurement of the corresponding plots terminates. As new acreage is acquired, plots are added to maintain the ratio of one plot per 320 acres. If a given acquisition is less than 320 acres, a pair of plots won’t be added until it and subsequent acquisitions sum to at least 320 acres.

CFI measurements begin in the fall of the nominal year and finish during the winter. Data for the 100 smaller plots is taken during the summer of the following year. A CFI “plot” (the center of which is a “point” marked by a painted metal stake) is a fixed circular area with a radius of 52.7 feet (16.1 meters). Within this plot each tree greater than 4.9” dbh (diameter at breast height, 4.5 feet above ground) is assigned a number and is tallied. Tree numbers and dbh lines are repainted on all trees during each five-year re-measurement. Data taken on each tree consists of: species, dbh, merchantable height, percent defect, presence of insect/disease/physical damage, and vigor (good/fair/poor/cull). On each CFI plot, understory data is collected by tallying by species all trees with dbh between 1.6 inches and 4.9 inches.

On a subset of 100 plots, a 1/50-acre (16.7 foot radius) circular area is measured to provide data on fecundity of the seedlings and saplings less than 1.5” dbh. On these 100 smaller plots all seedlings from 1 inch in height to 1.5” dbh are measured for species, basal diameter (diameter at ground level), dbh (for trees taller than 4.5 feet), and total height. Measurements of the smaller trees (those less than 5” dbh) were added to the data collection beginning with the 1992 CFI, and Pioneer Forest staff took responsibility for gathering the data beginning with the inventory of 1997.

When timber management occurs on Pioneer Forest, CFI plots are treated in the same manner as any other area of the forest. When a tree needs to be removed according to Pioneer’s single-tree selection style of management, it is marked and cut. This allows the CFI to reflect actual volume and growth responses to single-tree selection on a forest-wide scale. On the other hand, if a plot happens to fall in a glade, road, powerline, or a natural or other special area that is not harvested, the new measurements continue to be included.



The plots represent a broad cross-section of sites across the forest, since they are located on various different slope positions, aspects, soil depths, and cover types. This allows for data to be taken from a relatively small proportion of the forest but still be representative of the land as a whole. When the area measured on all CFI plots is totaled, it is nearly 100 acres of the forest.

With each re-measurement, five years of growth data is taken on every tree in every plot. With the establishment of baseline data for Pioneer Forest beginning in 1952, we are able to track the growth and vigor of individual trees, and accurately study forest change by site quality under single-tree selection management over long periods of time. From this data, accurate forest-wide volume estimates are obtained. The change in volume from the last inventory is used along with other factors to determine average yearly growth per acre. This figure is then used for future yearly harvest planning.

Pioneer Forest is recognized as having the oldest continually maintained CFI dataset in Missouri, and among the largest within this region of the country. It is a crucial management tool on the forest and is valuable for other independent forestry research.

## OZARK CHINQUAPIN FOUNDATION SEEKS ADDITIONAL RECORDS

Steve Bost of the Ozark Chinquapin Foundation met in both field and office with board and staff of L-A-D Foundation and Pioneer Forest in February to review their work on the distribution and recovery of Ozark chinquapin (*Castanea ozarkensis*). This species of tree is mostly uncommon across southernmost Missouri, and blight has reduced populations dramatically since the 1950s. George Yatskievych, author of *Steiermark's Flora of Missouri*, notes its occurrence from a handful of counties in the southwest corner of the state (it has been known from Roaring River State Park) and from Howell and Oregon counties in south-central Missouri. Anecdotal information indicates it also may have occurred in Ripley and Dent counties. *Castanea* (chestnut) pollen has been confirmed from Cupola Pond in Ripley County, and at least one population of plants has been reported from the Eleven Point River watershed.

Pioneer's interest is in locating specific and verifiable records or plants from counties where Pioneer Forest owns land. The Ozark Chinquapin Foundation continues to study known populations of the plants and hopes to discover a disease resistant form.



Above: Closeup of Ozark chinquapin (*Castanea ozarkensis*) leaves. Ozark chinquapin has several look-alike species, including Chinese chestnut, chinquapin oak, and Allegheny chinquapin. Ozark chinquapin can grow 40—60' tall, tends to have more elongated leaves, and has burs that are more bristly than its look-alikes.

Right: A young Ozark Chinquapin at the Missouri Botanical Garden.

PHOTOS USED WITH PERMISSION FROM THE MISSOURI BOTANICAL GARDEN



## CAVE RESEARCH MONITORING

Members from caving grottos and volunteers from the Cave Research Foundation explore, map, gate, and inventory caves on L-A-D Foundation land and regularly meet with staff to maintain records up-to-date.

This year volunteers with the Cave Research Foundation found the gate at the entrance to Wallace Well to have been breached, and they subsequently repaired it in September. That cave, located just below Cave Spring on L-A-D Foundation land along the Current River, has been maintained as closed for many years since it is

considered hazardous for exploration by visitors floating the river. Researchers also visited several other caves this year along the Current River below Current River State Park, noting cave conditions and recording gray bat populations.



Cave researcher in cave on Pioneer Forest. DAN LAMPING

## INSTITUTE FOR BOTANICAL TRAINING COMPLETES VEGETATION SAMPLING AND BASELINE MONITORING



Vegetation sampling on Jerktail Mountain, May 2018.  
NEAL HUMKE

Pioneer Forest contracts its vegetation monitoring studies with the Institute of Botanical Training (IBT), formerly based in Salem and now in Springfield. They initially established permanent plots and conducted baseline inventories at the Pine-Oak Woodland Ecological Management Area near Round Spring and has been a key partner with the National Park Service led monitoring at the Jerktail Mountain Ecological Management Area. The initial work has been followed up by re-sampling vegetation from the permanent plots in order to assess the results of management, including the effects of prescribed fire.

During this past year IBT re-sampled four permanent plots in the pine-oak area and assisted with NPS plots atop Jerktail Mountain. They established baseline vegetation inventories at Thompson Hollow Glade, an area where the core is completely devoid of encroaching woody vegetation despite having had no fire or noticeable disturbance in recent decades. The glade itself is dolomite bedrock with rhyolite exposed above. There are seeps below the glade that empty into Thompson Hollow Creek. Old, gnarly eastern red cedar (*Juniperus virginiana*) here have been estimated by the University of Missouri Tree Ring Laboratory to be more than 340 years old.



## L-A-D FOUNDATION

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

### *Stewardship and Recreation*



*Many groups collaborate to build and maintain trails on the Roger Pryor Pioneer Backcountry. GREG IFFRIG*

### **CURRENT RIVER TRAIL COMPLETED: BRUSHY CREEK TO ROUND SPRING**

The Current River Trail was conceived as a long-distance hiking trail along the Current River. A new segment from Brushy Creek to Round Spring connects a long-standing and much larger network of trails, the Brushy Creek and Laxton Hollow Trails, and the Blair Creek Section of the Ozark Trail along a 25-mile section of the Current River, crossing lands of Pioneer's Roger Pryor Pioneer Backcountry and National Park Service Ozark National Scenic Riverways. The trail would eventually enable long-distance travel within the Current River watershed to combine overland hiking with river travel.



*Luise cooks for hungry trail volunteers at Current River State Park. GREG IFFRIG*

In 2006, volunteers from the Sierra Club scouted and flagged pieces of the trail, eventually establishing a connection between the mouth of Brushy Creek and Round Spring. In 2008 the results of these scouting trips were accumulated and mapped by John Roth and Greg Iffrig as a proposed route. Several years passed with the routing under review by NPS staff.

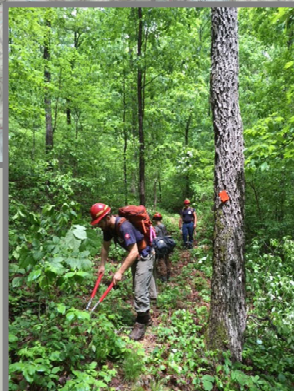
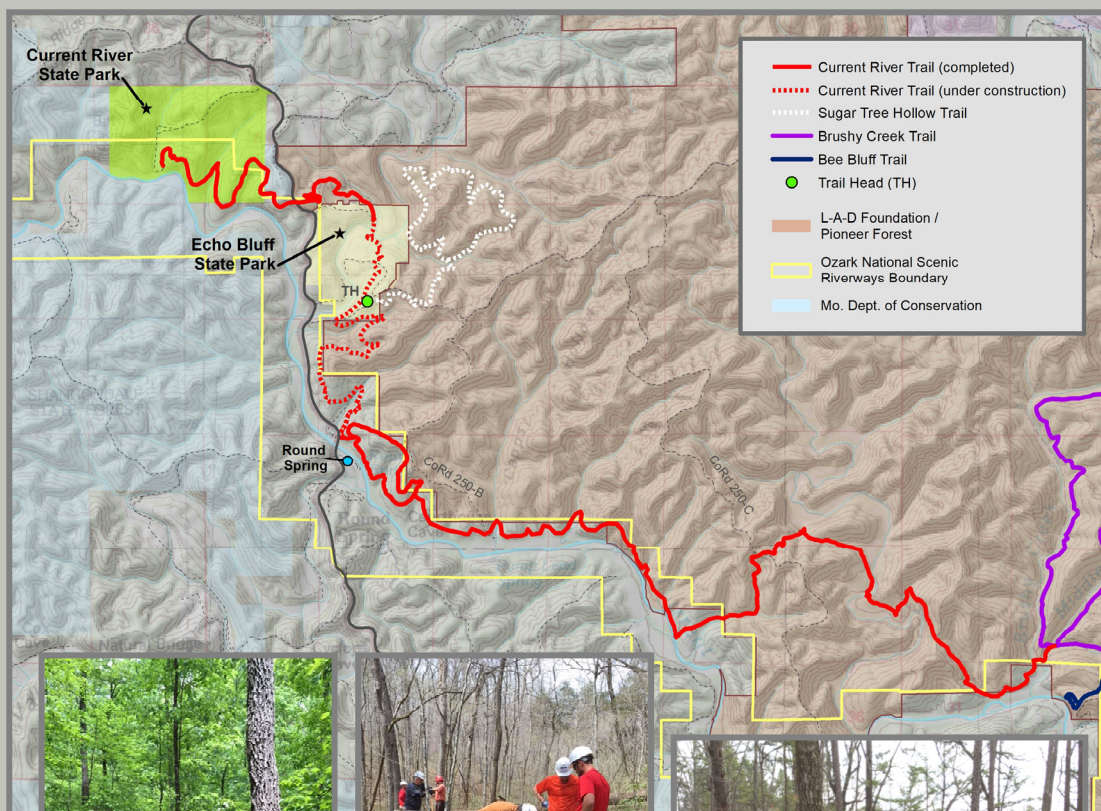
A concerted effort towards construction began after NPS finalized approval. Sierra Club scheduled volunteer construction crews over weekends and began a popular week-long outing each October. A member of the Missouri Chapter of the Sierra Club living in Germany, Luise Stephan, began providing legendary healthy, home-cooked meals twice each day, fueling volunteers through long hours of trail work. The Ozark Trail Association also organized numerous work trips, and several of their well-attended Mega Events helped make significant progress along large segments of the trail.

During fall 2017 and winter 2018, volunteers and hired hands worked to complete final construction of the Current River Trail. Weather delays occurred more than once. The L-A-D Foundation hired a four-person

AmeriCorps Emergency Response Team crew from June 18-22, completing cleanup and making the final connection to Pioneer's existing backcountry trail system.

We acknowledge the successful efforts that individuals and organizations made this year towards the completion of this remarkable outdoor recreation resource, enhancing river- and Backcountry-based experiences for decades to come.

Opportunities for extending the Current River Trail farther upriver are under consideration. Construction between Round Spring and Echo Bluff State Park began in October 2018. The segment between Echo Bluff and Current River State Park has been completed. The possibility to continue the trail upriver to Pulltite, perhaps even to Montauk State Park, is under consideration.



*Scenes along the Current River Trail enjoyed by those working on its completion this past year.*  
KATHIE BRENNAN



## PRIORITIZING INVASIVE SPECIES CONTROL AND ERADICATION

A growing number of exotic invasive plants and animals are threatening native populations and high-quality natural areas here in Missouri. The L-A-D Foundation has increased its efforts to control some of the most threatening on its land and works with others as part of statewide efforts.

**Feral Hogs.** In 2016 the L-A-D Foundation adopted a policy supporting feral hog control and eradication, joining a statewide initiative led by the Missouri Department of Conservation (MDC). Since then the Pioneer staff has searched for sign across our lands, then assembled traps to catch and kill these animals. Success will require a persistent effort by many individuals and organizations across the state.

*“Over the past nine months Pioneer staff members have taken 264 wild hogs from Pioneer lands. That is the highest number of animals taken for any year since we began eradication efforts.”* Brandon Kuhn, reporting to the board, October 2018.

Statewide efforts during this past year removed 9,300 animals. These efforts are being coordinated by MDC and according to Mark McLain, the MDC feral hog elimination leader, the strategy has been focused on eliminating groups of hogs within specific areas.

*“We’ve been very strategic in our efforts, focusing on removal of whole groups of feral hogs at a time, before moving on to another area. This strategic approach is important because if we leave even a few feral hogs behind in an area, they can reproduce quickly and put us back where we started.”* Mark McClain, Missouri Department of Conservation, November 1, 2018

**Wintercreeper (*Euonymus fortunei*) and Japanese Honeysuckle (*Lonicera japonica*) at Ball Mill Resurgence Natural Area.** Both of these plant species are evergreen, perennial, and native to China, Japan, and Korea. Following their introduction in the United States they have become invasive in natural areas in most eastern states.

Wintercreeper has been progressively spreading in Illinois, Indiana, Kentucky, Missouri, and Tennessee. The Invasive Plant Atlas of the United States describes it as a “vigorous vine that invades forest openings and margins.” Because it is shade tolerant, grows year-round, and develops a dense groundcover, this invasive species displaces native vegetation. Our treatment must be equally vigorous.

The Missouri Department of Conservation reports Japanese honeysuckle “as an invasive vine which seriously alters or destroys the understory and herbaceous layers of the communities it invades, including a variety of habitats — prairies, barrens, glades, flatwoods, savannas, floodplains, and upland forests.” It has been reported to reach 80 feet in length.

Both species occur at several locations within Ball Mill Resurgence Natural Area (see next page). We undertook an aggressive treatment here this fall during the dormant season. Our five-person seasonal crew led by Land Stewardship Coordinator Neal Humke completed initial efforts using techniques that have been proven effective elsewhere. Without treatment this small area could be easily overtaken. However, because it is small, we may be able to eliminate or reduce the presence of these species, then remain vigilant in our defense of the area. Results will be evaluated in the spring of 2019.



Above: *Winter creeper*  
THE NATURE CONSERVANCY

Below: *Herbicides are used to control and eradicate invasive plant species.*  
NEAL HUMKE







## FALL 2018 / SPRING 2019 STEWARDSHIP CREWS

This year marks the sixth season of stewardship crews working on Pioneer Forest and other L-A-D Foundation lands. Joining these crews each year are individuals seeking experience working in the outdoors. They come with diverse academic backgrounds as well as on-the-ground training and experience. Many are seeking careers in forestry and wildlife conservation, national and state park management, and conservation biology. Their work benefits our ongoing stewardship of land, enabling us to conduct prescribed burns and invasive species removal.

Our fall crew worked from October through November 2018. They removed eastern red cedar trees from glade areas, prepared fireline in the Pioneer Forest Pine-Oak Woodland Ecological Management Area, and conducted invasive species control at the L-A-D Foundation's Blue Spring Branch Conservation Area in Perry County. See below for a profile of our fall crew.

Our winter crew begins work in January, with Eric Duft returning, joined by Robert Langellier (University of Missouri - Columbia, bringing experience from his seasonal work with the Missouri Department of Conservation and the American Conservation Experience), Aidan Mazur (wildlife ecology degree from University of Wisconsin, with extensive backcountry knowledge), Lewis Meyers (Masters Degree in biology from Central Washington University, extensive western wildland fire suppression experience), and Hannah Reger (Yakima Valley Community College, bringing years of experience in western states with firefighting, noxious weed control, and prescribed burn operations). This crew will continue work removing aggressive eastern red cedar and conducting fireline preparation.



*Our fall crew following a day of work on a glade within Pioneer's Pine-Oak Woodland Ecological Management Area.*

*Back row: Emma Keele (wildlife degree from University of Nebraska, seeking field and research experience before pursuing a graduate degree in conservation biology), Brian Swimelar (degree in wildlife ecology from Auburn University, studied in the longleaf pine ecosystem and a certified prescribed burn manager).*

*Front row: Emily Roberts (environmental science degree from University of Central Arkansas, broad experience from western states and the Midwest), Chris Waas (wildlife ecology degree from University of Wisconsin, diverse field experiences from Alaska and the Midwest), and Eric Duft (returning, University of Missouri graduate, international studies and burn experience from Colorado and North Carolina).*

NEAL HUMKE



## MANAGEMENT OF THE VIRGIN PINE AREA AND THE RANDOLPH TRACT

*"I wanted to express my gratitude for the marvelous experience I recently had visiting the Pioneer Forest and Virgin Pines. I'm without words to describe the profound and inspiring opportunity to see and feel the pure energy of that place."*

Ray Pusilo, Marshfield, MO, May 25, 2018



*Above the canopy at Pioneer's Pine-Oak Woodland Ecological Management Area, January 2018.*

*AERIAL DRONE PHOTOS: KRISTOPHER CORBETT*

*On the ground, Pioneer Forest Manager Jason Green watches the fireline. GREG IFFRIG*



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## Outreach and Education



Guests at the annual Pioneer Forest community barbecue, April 2018.  
DENISE VAUGHN



Guests shared conversations over dinner at the 12th annual Pioneer Forest BBQ, held April 26 at Pioneer Forest headquarters in Salem. They included people in the forest industry, public land managers, and Pioneer Forest's neighbors and friends.

Right: Tiny Gorman with Tiny's Hillbilly BBQ checks on chicken roasting in the smoker. They served chicken, pulled pork, and fixings to about 180 guests, the highest attendance since the event's inception.



Friends sang 'Happy Birthday' to Kay Drey, 85, during the BBQ. From left is L-A-D President Susan Flader, Drey, and L-A-D Treasurer Wayne Goode.

### 12TH ANNUAL PIONEER FOREST BBQ



Lively discussions and laughter punctuated the BBQ. From left, L-A-D Board Member Janet Fraley; her husband Julius Fraley; L-A-D Land Stewardship Coordinator Neal Humke; L-A-D past President John Karel; and L-A-D Board Member Leon Cambre.

PHOTOS THIS PAGE: DENISE HENDERSON VAUGHN



Kay Drey admired the view from the driver's seat in this 1957 Chevy Bel Air owned by Shannon County Southern Commissioner Herman Kelly.

## FRENCH FORESTERS TOUR PIONEER

In early November 2017 some of the leaders in the continuous-cover forestry industry in France and members of the Pro-Silva ‘back to nature’ forestry efforts in Europe visited the mid-south of the United States. The group’s tour was led by L-A-D Foundation Advisory Council member Jim Guldin. They spent portions of two days on Pioneer Forest in the company of Jason Green, Brandon Kuhn, and Dustin Collier.

Pro Silva was founded in Slovenia in 1989 and is a federation of professional foresters from 24 European countries promoting “forest management strategies which epitomize the maintenance, conservation, and utilization of forest ecosystems so that the ecological and socio-economic functions are sustainable and profitable.” Much like the mission of Pioneer Forest they believe that forests provide four principal benefits: the production of timber and other products; protection of soil and climate; maintenance of ecosystems; and recreation, amenity, and cultural aspects. They have recognized exemplary forests in five countries and states.



Left to right: Jim Guldin (L-A-D Advisory Council), Dustin Collier (Pioneer Forester), Si Balch (Consultant SAF), Brandon Kuhn (Pioneer Chief Forester), Roland Susse (seated-France), Tristan Susse (standing-France), Max Bruchiamacchie (France), Jason Green (Pioneer Forest Manager), Roland Burrus (France), and Ervard de Turkheim (France). JIM GULDIN

## PIONEER STAFF EDUCATE STUDENTS ON OZARKS FORESTRY

Pioneer Forest Manager Jason Green and Chief Forester Brandon Kuhn ran a booth at Timber Fun Day in Salem on September 3. They discussed the importance of forestry and logging in the local community. This year’s event also featured fiddling by L-A-D Foundation advisor and former Forest Manager Terry Cunningham. On September 20, Jason Green hosted a booth at Beef Days where he taught Dent County’s 3rd graders about the importance of trees and forestry. Events like these are an opportunity not only to promote sustainable forest management practices, but to inspire a new generation to enter a profession that has been a major economic driver in the region for more than 150 years.



## VISITS TO L-A-D FOUNDATION LANDS

Each year various groups and individuals have visited, toured, or volunteered to work on Pioneer Forest and other L-A-D Foundation lands. This past year included:

- **September 29, 2017.** Students from the University of Tennessee toured Pioneer Forest as part of a class on forestry and fire.
- **October 14-22, 2017.** The Sierra Club, Eastern Missouri Group conducted trail maintenance on the trails of the Roger Pryor Pioneer Backcountry.
- **November 6, 2017.** Missouri State Park Director Ben Ellis and staff toured the Backcountry.
- **November 8-9, 2017.** Pioneer staff hosted a tour of Pioneer Forest for foresters visiting the United States from France.
- **February 6, 2018.** Steve Bost, Ozark Chinquapin Foundation, visited the Pioneer Forest office to discuss research efforts and visited plantings on Pioneer Forest with staff and the L-A-D Stewardship Committee.
- **March 20, 2018.** Dr. Michael Fuller, an archaeologist, visited Rocky Hollow Natural Area with Susan Flader, Greg Iffrig, Neal Humke, Rick Thom, and Jim H. Wilson.
- **April 12, 2018.** Jason Green, Brandon Kuhn, Neal Humke, and Dustin Collier hosted a Mixed Wood Tour with University of Missouri and US Forest Service staff at the Virgin Pine area.
- **May 1, 2018.** Brad Jacobs and Rick Thom led a woodland bird workshop on Pioneer Forest.
- **May 30-31, 2018.** Students with the University of Missouri School of Natural Resources visited the forest with Dr. Ben Knapp. Pioneer staff discussed uneven-aged management, pine management, use of fire, CFI, timber marking, sale administration, and logging and sawmill operations.
- **June 7, 2018.** MDC Ozark Regional Natural History Biologist Susan Farrington featured the Pine-Oak Ecological Management Area as part of her three-day Ozark Plant ID Workshop for Managers. She explained: *"I like using the Virgin Pine woodland because it has a great diversity of woodland plants in a short distance. I use it on the final day of the three-day workshop so that they can review a lot of the species they learned."*
- **June 18-22, 2018.** AmeriCorps St. Louis worked to finalize the Current River Trail in the Pioneer Backcountry.
- **October 6-14, 2018.** Missouri Chapter Sierra Club, Eastern Missouri Group visited Roger Pryor Pioneer Backcountry to conduct trail maintenance and construction.
- **October 10, 2018.** Neal Humke led Missouri State Park managers based at Echo Bluff State Park on a tour of area resources, including a stop on Pioneer Forest.
- **October 23, 2018.** Consulting Forester John Fleming brought Ryan Winter and Doug Tedrick to Pioneer Forest. Ryan's family owns a large landholding in east central Missouri, and they are interested in the uneven-aged harvesting method used by Pioneer Forest.
- **October 25, 2018.** Josh Reeves and Greg Iffrig met with David Cain of the Mark Twain National Forest at Greer Spring and Dennig Road where L-A-D has a conservation easement.



Above: Dr. Michael Fuller visits Rocky Hollow. GREG IFFRIG  
 Right: Pioneer Forest Manager Jason Green and Chief Forester Brandon Kuhn joined L-A-D Foundation Board Liaison Greg Iffrig and President Susan Flader to lead new Missouri State Parks Director Ben Ellis and his staff on a tour of the Roger Pryor Pioneer Backcountry in November 2017. The Foundation donates the lease of the trails in the Backcountry to Missouri State Parks to maintain for public use. GREG IFFRIG



## ATTENDEES AT TWO CONFERENCES VIEW L-A-D EDUCATIONAL DISPLAYS

L-A-D Foundation representatives interacted with colleagues while they hosted exhibits at two conferences in 2018: the Missouri Natural Resources Conference, held January 31-February 2 at Tan-Tar-A Resort at Lake of the Ozarks, and the annual convention of the Conservation Federation of Missouri, held March 9-10 in Jefferson City.

These events offer staff and board members opportunities to share information about the Foundation and to gather ideas and news from participants and fellow organizations.



Left: L-A-D Board Member Rick Thom and MDC retiree Ed Kaiser study a map at the L-A-D exhibit at the Conservation Federation of Missouri Annual Convention.

Right: Mark Twain National Forest Supervisor Sherri Swenke, L-A-D Foundation President Susan Flader, and Chief Forester Brandon Kuhn visit during the 2018 Missouri Natural Resources Conference. PHOTOS: DENISE HENDERSON VAUGHN

## BRIAN BROOKSHIRE DISCUSSES TIMBER MARKETS WITH L-A-D BOARD

Brian Brookshire, Executive Director of the Missouri Forest Products Association (MFPA), was invited to the October 2 board meeting to provide perspective on how local forestry and timber markets have been influenced by national and global economic forces.

Ten years ago, timber that was cut in the United States was commonly shipped in containers to China for processing and manufacture, then shipped back to the United States. Since then, the middle class in China has increased their demand for wood products to be used in their own economy. Today 80% of what is shipped to China remains in-country. Missouri's red oak is the state's bread-and-butter product with 75% of that going to China for furniture production and flooring. Pioneer's timber base averages larger diameter trees which produce 15-20% more grade lumber, and it's unclear how much of Pioneer's lumber goes to China specifically.

Given that China has been the primary end market for Missouri wood, Brookshire noted the challenges posed by recent national economic policy. He reported sharp reductions in exports, with some local timber mills experiencing an increase in stockpiled wood products. Brookshire also said that right now timber prices benefit from a strong domestic economy and that Missouri leads the country in production of hardwood ties, which are used domestically. Bunker's Missouri Tie, for instance, is one of the nation's leading tie producers. Likewise lumber at the Smith Flooring plant is all produced and sold in the U.S. It is possible that global supply chains might shift, at least temporarily, and that other wood product industries might benefit from increased availability of higher-quality domestic wood. Brookshire reported that a Wycliffe, KY, paper plant was recently bought by a Chinese company and may come back on line to produce brown paper for Amazon, though they are expected to pay less for standing trees. Canada is also a big market and receives a huge supply of wood from the United States.

So far tariffs have not affected Pioneer Forest stumpage prices, but some uncertainty remains. This will be an issue that Pioneer Forest and the MFPA will monitor closely in months to come.



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*GRANTMAKING AND COMMUNITY SUPPORT*  
PUBLIC POLICY  
ADMINISTRATION

## *Grantmaking and Community Support*



*A 2017 L-A-D Foundation grant funded new equipment for the ACSTL Emergency Response Team. AMERICORPS St. LOUIS*

### 2017 GRANT RECIPIENTS

In October 2017, the L-A-D Foundation Board of Directors approved the following grant awards:

- **AmeriCorps St. Louis Emergency Response Team** – Equipment for conservation work in Missouri
- **Friends of the Eleven Point River** – Restoration of Greer Mill
- **Great Rivers Environmental Law Center** – Efforts to support Missouri State Parks
- **Greater Ozarks Audubon Center** – Scholarships for Ozarks students to attend the Green Leadership Academy for Diverse Ecosystems (GLADE)
- **Kaleidoscope Discovery Center** – Installation of a tree ring exhibit and mural to teach students about plant biology
- **Missouri Cave and Karst Conservancy** – Equipment costs for cleanup of Goodwin Cave and sinkhole
- **Missouri Coalition for the Environment** – Outreach and education regarding the management of the Ozark National Scenic Riverways
- **Ozark National Scenic Riverways** – Materials for a conservation education program on the Current River Trail
- **Ozark Trail Association** – Trail building along the Current River Trail
- **Reynolds County Genealogical Society** – Forest and timber exhibit at the Reynolds County Museum
- **Show-Me Missouri Backcountry Horsemen** – Tools for trail maintenance
- **Sierra Club, Missouri Chapter** – Outreach and education regarding the management of the Ozark National Scenic Riverways
- **The Conservation Fund** – Protection of land bordering the Piney Creek Wilderness



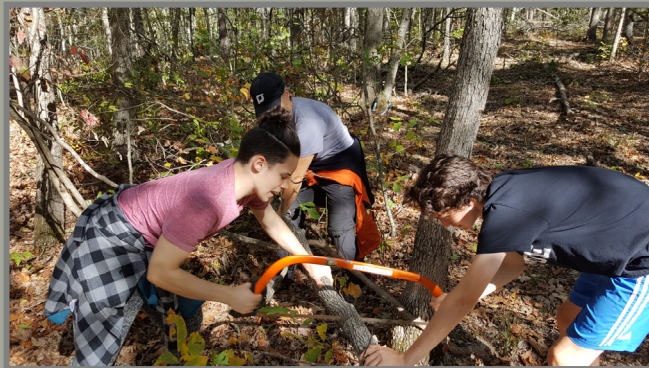
*Top: Dustin Collier with Kaleidoscope Discovery Center staff.*

*Center: Greg Iffrig with Marsha Copeland of Back Country Horsemen of Missouri.*

*Bottom: Clare Holdinghaus-Ireland with Katie Henry of Great Rivers Environmental Law Center.*



## 2017 GRANT PROJECTS



Top left: *Students learn about tool use, OZARK NATIONAL SCENIC RIVERWAYS*  
 Top right: *Students in the Hiking through History program, OZARK NATIONAL SCENIC RIVERWAYS*  
 Middle left: *Film Festival hosted by the Missouri Coalition for the Environment, ALAN SHAWGO*  
 Middle right: *L-A-D funded several chainsaws for the AmeriCorps St. Louis team, AMERICORPS ST. LOUIS*  
 Bottom left: *Equipment used to clean debris Goodwin Cave, KLAUS LIEDENFROST*  
 Bottom right: *A trail maintenance day hosted by the Sierra Club, JOHN HICKEY*



## 2018 GRANTS PROGRAM

In October 2018, 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
- **Great Rivers Environmental Law Center** – Outreach project regarding riverways management
- **Greater Ozarks Audubon Society** – Scholarships for Ozarks high school students to attend the Green Leadership Academy of Diverse Ecosystems (GLADE)
- **Kaleidoscope Discovery Center** – Installation of a tree root exhibit and portable displays to teach children about trees native to Missouri
- **Mark Twain Forest Watchers** – Citizen engagement in the management of the Mark Twain National Forest
- **Missouri Archaeological Society** – Publication and distribution of educational posters highlighting Schoolcraft's 1818-1819 journey through the Ozarks
- **Missouri Caves and Karst Conservancy** – Cleanup of Goodwin Cave
- **NatureCITE** – A study into eastern red cedar, often managed as an aggressive native species
- **Ozark Trail Association** – New laptops and software to improve management of volunteers and donations
- **Reynolds County Genealogical Society** – Creation of an exhibit on the history of the forest and timber industry in Reynolds County
- **Sierra Club, Missouri Chapter** – Outreach and education regarding management of National Park lands along the Current River
- **Stream Teams United** – A two-day educational trip on the Current or Big Piney River

## 2018 PIONEER FOREST SCHOLARSHIP RECIPIENTS

**Bunker High School.** Brian Lanham Jr. plans to pursue a degree in forestry or law enforcement. He is enrolled at Southwest Baptist University in Salem, MO.

**Ellington High School.** McKenna Goodman will attend Missouri State University and pursue a degree in Speech-Language Pathology.

**Eminence High School.** Kyndall Copeland is enrolled at Missouri State University in West Plains. He plans to pursue a career in conservation.

**Summersville High School.** Makaylia Spencer plans to pursue a business degree at Missouri State University in West Plains.

**Van Buren High School.** Wyatt Dougherty will be attending the Southeast Lineman Training Academy in Trenton, Georgia. His career goal is to obtain a job as an apprentice lineman in his hometown of Van Buren, MO. This is the first year Pioneer Forest has offered a scholarship for this school district.



*Pioneer Forest Technician Matt Skaggs presents a scholarship to Bran Lanham.*

## 2018 LOCAL COMMUNITY SUPPORT

**Bunker High School Project Prom.** This program provides safe and fun activities for Bunker High School students after prom.

**Stream Team 1028 (Jadwin, MO).** Pioneer Forest supported a cleanup of the Upper Current River.

**Ozark Mountain Festival.** Pioneer Forest made donations to the Eminence Chamber of Commerce to support this celebration of Ozark life and recreation. Activities include Civil War encampments, arts, crafts, and a classic car show.

**Timber Fun Day.** Pioneer Forest helped to fund this event held in Salem, MO, on September 3, 2018.

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## Public Policy



*Greer Mill, located on the Eleven Point River. GREG IFFRIG*

### MISSOURI'S FABLED ELEVEN POINT RIVER AN ORIGINAL UNIT OF THE NATIONAL WILD AND SCENIC RIVERS SYSTEM — CELEBRATING 50 YEARS —

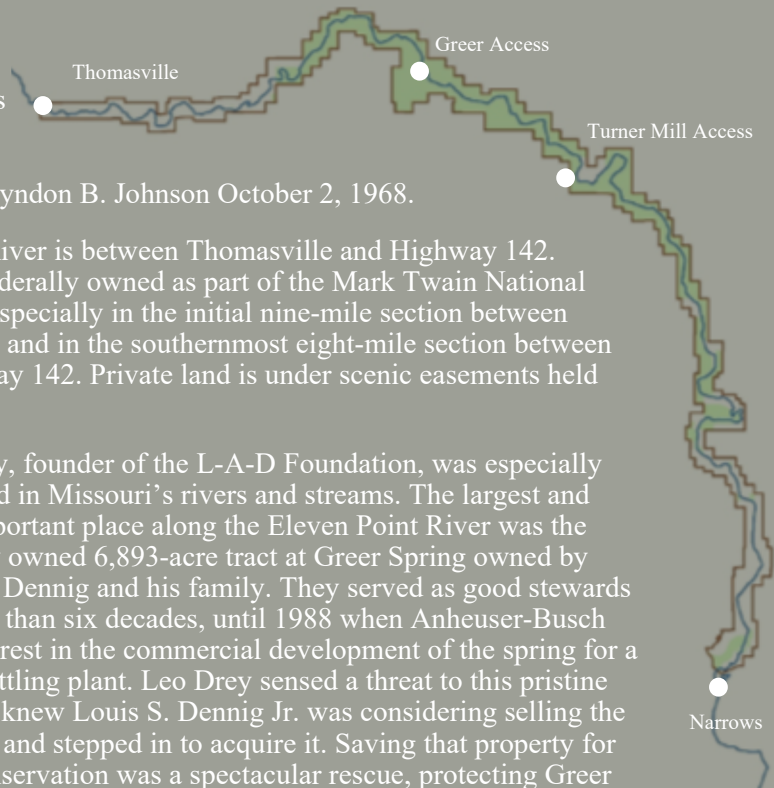
A 44-mile section of Missouri's Eleven Point River on the Mark Twain National Forest was among the original eight rivers included in the National Wild and Scenic Rivers System when it was established by Congress and signed into law (Public Law 90-542) by President Lyndon B. Johnson October 2, 1968.

The Eleven Point National Scenic River is between Thomasville and Highway 142. Most of the scenic river lands are federally owned as part of the Mark Twain National Forest. Some are privately owned, especially in the initial nine-mile section between Thomasville and Cane Bluff Access and in the southernmost eight-mile section between Riverton and the Narrows at Highway 142. Private land is under scenic easements held by the US Forest Service.



*An editorial cartoon celebrating Leo's purchase of Greer Spring. TOM ENGLEHARDT*

Leo Drey, founder of the L-A-D Foundation, was especially interested in Missouri's rivers and streams. The largest and most important place along the Eleven Point River was the privately owned 6,893-acre tract at Greer Spring owned by Louis E. Dennig and his family. They served as good stewards for more than six decades, until 1988 when Anheuser-Busch took interest in the commercial development of the spring for a water bottling plant. Leo Drey sensed a threat to this pristine area. He knew Louis S. Dennig Jr. was considering selling the property and stepped in to acquire it. Saving that property for river conservation was a spectacular rescue, protecting Greer Mill, the natural setting of Greer Spring (the second largest spring in Missouri), the remarkably rugged and steep mile-long, spring gorge and miles of river frontage, along with thousands of acres of native forest buffering the Eleven Point National Scenic River.





Leo's intention was to convey the entire property to the Mark Twain National Forest, and he was joined in that effort by the Anheuser-Busch Corporation. Together they donated a million dollars to reduce its purchase price for the public, a bargain sale, with the transfer completed by the River Network, a nonprofit organization now located in Denver, Colorado.

A condition of Leo's purchase of the property was that the Dennig family reserved a right to use a 110-acre cabin site along Greer Spring branch for 25 years. That possessory use expired in May of 2013 and the 'Dennig Road' they had used to reach their cabins was then subject to limited administrative use which Leo and Kay Drey had standing to enforce. They donated their perpetual interest in maintaining this limited use to the L-A-D Foundation.

The L-A-D Foundation continues its engagement with issues directly associated with this nationally important river resource. Beginning in 2014 the L-A-D Foundation issued a series of grants to the Friends of the Eleven Point River to assist in their work with the Mark Twain National Forest in a remarkable stabilization and restoration of the Greer Mill building. In 2015 the Foundation assisted Mark Twain staff in establishing baseline documentation for 1,321 acres of scenic easement along the lower eight miles of the Eleven Point National Scenic River. This past year, working with Mark Twain staff, the Foundation contracted for research into the cultural significance of the eight structures known as the Dennig cabins located directly below the mill along Greer Spring Branch. Indications are that they are structurally sound and may qualify for listing on the National Register of Historic Places. Greer Mill was listed on the National Register in 2005.



*Mists hang over the crystal-clear waters rushing from Greer Spring, which flow 1.3 miles down the spring branch before entering the Eleven Point National Scenic River. DAN ZARLENGA*

## RESEARCHING ELIGIBILITY OF THE DENNIG CABINS AT GREER SPRING FOR INCLUSION ON THE NATIONAL REGISTER OF HISTORIC PLACES

In consultation with the Mark Twain National Forest, the L-A-D Foundation funded research by Bonnie Stepenoff, professor emerita of history, Southeast Missouri State University, to determine the eligibility of the “Dennig Cabins Historic District” to the National Register of Historic Places. Bonnie has conducted similar research for Dillard Mill, Greer Mill, and historic facilities throughout the Missouri State Park system.

Fieldwork identified and described eight structures, all part of a rustic retreat constructed in the 1940s, and all apparently structurally sound. They are located on a small table of land, part of an alluvial plain formed by Greer Spring Branch as it flows toward the Eleven Point River. Most of the structures are substantially unaltered and retain their historic integrity. The period of association with notable events is 1944-1988, with the property being associated with significant contributions to law and conservation.

St. Louis businessman Louis S. Dennig inherited the 7,000-acre property, including Greer Spring, from his father, Louis E. Dennig who had acquired the tract in 1915. The father was an early supporter of the Conservation Federation of Missouri, and in 1936 he supported the campaign to pass the constitutional amendment establishing the Missouri Conservation Commission. Following his death, the son hired local carpenters in 1944 to construct the cabin complex which is associated with an important 1933 court decision confirming that private landowners have the right to limit public access to non-navigable streams and was cited and upheld by subsequent rulings. Relative to conservation, the Dennig cabins represent the “effort of several generations of one family to preserve an extraordinary landscape in its natural state.”

Following Anheuser-Busch’s controversial proposal to buy the land and bottle its spring water, the Dennig family agreed to sell their property to Leo Drey in 1988, and he later arranged for its transfer to the Mark Twain National Forest.

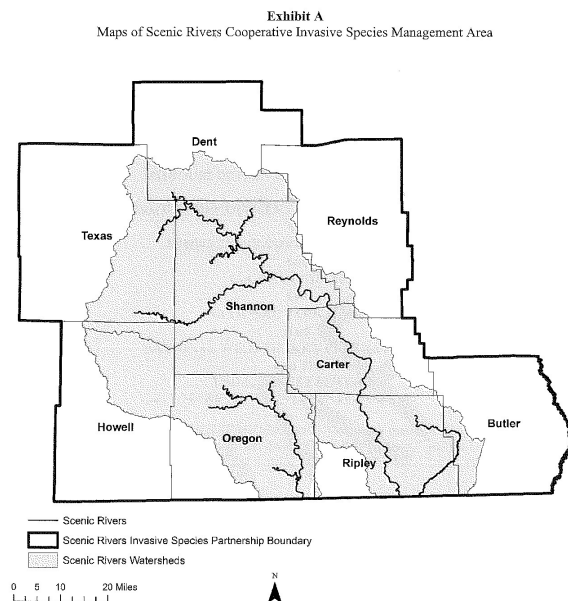
A draft of the nomination to include the Dennig Cabins Historic District on the National Register of Historic Places, along with maps and photos, is currently under review by Mark Twain National Forest staff and the State Historic Preservation Office. The United States Department of the Interior National Park Service must certify that the property is eligible for the National Register.



Left: *Dennig Cabins along Greer Spring Branch.*  
GREG IFFRIG  
Above: *Fireplace in one of the Dennig Cabins.*  
MARK TWAIN NATIONAL FOREST



## SCENIC RIVERS INVASIVE SPECIES PARTNERSHIP



One indicator of the level of importance of invasive species is the estimate that 42% of the plant and animal species listed as threatened and endangered under the Endangered Species Act are at risk primarily from competition with, or predation by, invasive species. This is according to the recently organized Scenic Rivers Invasive Species Partnership, a group of nine government agencies and private organizations that have agreed to work together to more effectively address the significant and escalating problem of invasive species in Southern Missouri.

Participating are The Nature Conservancy, Missouri Departments of Conservation and Natural Resources, Midwest Invasive Plant Network, Missouri Invasive Plant Network, L-A-D Foundation, National Park Service, National Wild Turkey Federation, and USDA Mark Twain National Forest. An MOU outlining mutual commitment and opportunities for cooperation has been developed.

Included within this management area are Butler, Carter, Dent, Howell, Oregon, Reynolds, Ripley, Shannon, and Texas counties. Of mutual benefit is the shared information and cooperative work to inventory, monitor, control, and prevent the spread of invasive species. The result is more opportunity for challenge cost share agreements, collection agreements, volunteer agreements, grants, contribution agreements, cooperative agreements, and procurements.

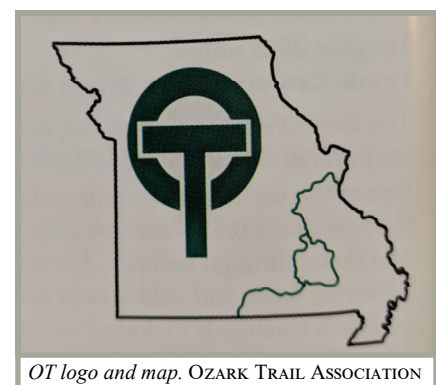
For this area of southern Missouri, the potential is enormous for short- and long-term damaging effects on native tree regeneration in forests and woodlands, quality of public and protected land, natural areas, endangered and threatened native species, aesthetics, and eco-tourism.

## PRESIDENT FLADER ADDRESSES NATIONAL CONSERVATION LEADERS

National and state conservation leaders, public officials, and private landowners from across the nation met in Springfield October 2-4 as part of the US Fish and Wildlife Service's Partners for Fish and Wildlife program and Private Lands Partners Day 2018. Held at the White River Conference Center, the event featured hands-on opportunities, field trips, and discussions on topics such as karst issues, successful public/private partnerships, watershed health, and generational conservation partnerships. L-A-D Foundation President Susan Flader led the indoor plenary sessions on the final day with a keynote address, "Aldo Leopold/Leo Drey – The Land Conservation Ethic."

## PHOTOGRAPHS OF THE OZARK TRAIL

A recently published book, *The Ozark Trail* by landscape photographer Don Massey, was published by Blue Springs Press in 2017. It covers the entire 350-mile-long trail in each of its 13 sections, including the Blair Creek Section across the Roger Pryor Pioneer Backcountry. The Ozark Trail is a National Recreation Trail, and this book includes maps, a full-page photograph of Dillard Mill at the front, and mention of Pioneer Forest among the organizations who have made this long-distance trail a reality.



## L-A-D FOUNDATION

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

### *Administration*



*Board Liaison Greg Iffrig presents on lands issues at the L-A-D Foundation spring board meeting. DENISE VAUGHN*

## JOHN KAREL RETIRES AS L-A-D FOUNDATION PRESIDENT

John Karel joined the L-A-D Foundation board of directors in 1982. In 1999, Leo Drey asked him to step in as the Foundation's second president. John's long association with Leo and the Drey family and his deep understanding of the L-A-D Foundation's history and mission made him a perfect match.

John's biggest task came in 2004 when he accepted the gift of the 143,000-acre Pioneer Forest LLC on behalf of the Foundation. Former Vice-President Susan Flader noted, "among many changes, this was the most momentous as he skillfully guided the successful and ongoing transition to responsibility for the oversight of Pioneer Forest as a business within our private not-for-profit foundation." During his long tenure as board president, John also oversaw the 50th anniversary celebration of Pioneer Forest, an organization-wide land consolidation plan, expansion of the board, establishment of both a professional advisory council and a family advisory council, and preparation of management plans for the forest, the Backcountry, and ecological management areas. He also oversaw the acquisition of significant additions to natural areas, especially at Ball Mill Resurgence, Hickory Canyons, Jerktail Mountain, Lily Pond, along Blair Creek, and along the Current River.

At its annual meeting on October 2, 2017, the board presented John with a framed thank-you letter and photos of his work for the Foundation and across its lands. In all of this John demonstrated extraordinary leadership during a period of remarkable change and growth.



*Left: John Karel accepts a plaque from incoming Foundation President Susan Flader at the L-A-D fall board meeting in October 2017. CLARE HOLDINGHAUS-IRELAND*

*Above: Photos included in the plaque highlighted John's many years of service to the Foundation.*



## SUSAN FLADER ELECTED AS L-A-D FOUNDATION PRESIDENT

At its meeting October 2, 2017, the board elected Susan Flader to be the L-A-D Foundation's third president. Susan is professor emerita of American Western and environmental history at the University of Missouri-Columbia. She has had a long history with the Foundation, having served as a director since 1995, vice-president since 1999, and as the long-standing chair of the Stewardship Committee.

In 1999 she coordinated a conference on Missouri's private forests at the University of Missouri-Columbia, inviting a paper from Pioneer Forest staff, contributing a keystone paper on the "History of Missouri Forests and Forest Conservation," and editing the conference proceedings, *Toward Sustainability for Missouri Forests*, published in 2004 by the US Forest Service North Central Research Station. She also served as co-editor of *Pioneer Forest—A Half Century of Sustainable Uneven-Aged Forest Management in the Missouri Ozarks*, published in 2008 by the USFS Southern Research Station, to which she contributed a detailed historical review of Leo Drey's role in assembling Pioneer Forest and leading the way back to uneven-aged forest management.

In addition to being the primary scholar of Leo Drey and long-time friend of the Drey family, she is also a leading scholar and the first biographer of Aldo Leopold, and has served since 2002 as a director and five years as board chair of the Aldo Leopold Foundation. She has also served multiple terms as president of the Missouri Parks Association and the American Society for Environmental History and on the boards of the National Audubon Society, the Forest History Society, and the American Forestry Association.



## JANET FRALEY ELECTED TO FOUNDATION BOARD

Janet Fraley grew up and still lives on her family's farm in Texas County, near Houston, Missouri. She comes to the L-A-D Foundation after recently retiring from the Mark Twain National Forest with 30 years of service. She is a graduate of the University of Missouri-Columbia and also has an MS degree in civil engineering from Missouri University of Science and Technology in Rolla. For the past 14 years she managed the Lands and Special Uses Program for the Mark Twain where she significantly improved access, wilderness consolidation, water quality, and endangered species protection. She is active on boards and building committees in her community, including the Ozark Cemetery Association and 25 years as treasurer of the Texas County Library Board.



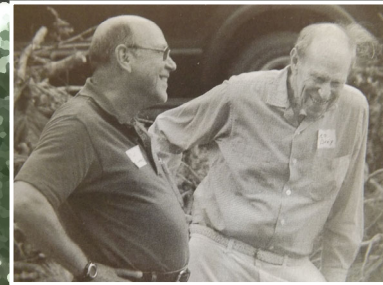
## REBECCA LANDEWE ELECTED TO FOUNDATION BOARD

Rebecca Landewe is the Current River Project Manager with The Nature Conservancy based in Van Buren where she oversees freshwater and forest management conservation initiatives in the Current River watershed. She has worked for the Environmental Protection Agency in Region 7, and for the Student Conservation Association in Alaska, California, and Washington. She graduated from the University of Missouri-Columbia with a degree from the School of Natural Resources and has a Master of Public Administration in Environmental Science and Policy degree from the Columbia University School of International and Public Affairs. She is a member of the Society of American Foresters, Ozark Trail Association, and the Van Buren Area Chamber of Commerce.

Clint Trammel graduated from the forestry program at the University of Missouri-Columbia and began working for Pioneer Forest in 1970, just as forest management nationwide was shifting to even-aged techniques through clear cutting. Against the new norm for his profession he continued practicing an uneven-aged, single-tree selection method of forest management.

Clint advocated for this method of forestry for his entire career, first as Pioneer Forest manager from 1978 to 2007, then as an Advisory Council member for the L-A-D Foundation from 2007 until 2018. A 1996 study from the University of Missouri-Columbia by Edward Loewenstein demonstrated just how well Pioneer Forest maintains the multiple age classes characteristic of uneven-aged forest management. It turned out to be evident at a scale of 0.6 acre, remarkable confirmation for Pioneer Forest and for Clint.

Clint was the longest serving manager in Pioneer Forest's history. During the protracted public controversy over silviculture on public lands, his demonstration of successful uneven-aged management on Pioneer eventually led both federal and state forests in Missouri and beyond back to acceptance of uneven-aged management. He also guided Pioneer through its certification in 2003 and its transfer to the L-A-D Foundation in 2004, assuring its perpetual protection. He was a friend to Leo Drey and to many in the forestry community. He will be missed.



Top: Clint and Leo Drey. LAURIE DREY  
Middle: Leo, Clint, and Kay Drey.  
MISSOURI DEPARTMENT OF  
CONSERVATION  
Bottom: Clint with his mother and his  
brother celebrating his retirement in  
2007. GREG IFFRIG  
Background: Clint (left) leads a tour of  
Pioneer. GREG IFFRIG

# Remembering Clint Trammel

(May 30, 1940 – June 21, 2018)



## MINERALS POLICY ADOPTED

This past year the board's Minerals Policy Task Force, chaired by Director Roger Hershey, reviewed the issue of minerals extraction and development on all Foundation lands, especially Pioneer Forest. The L-A-D Foundation's most sizeable asset is its 143,000-acre Pioneer Forest across six Ozark counties. Pioneer Forest demonstrates that its controlled, economically productive timber management also perpetuates a variety of associated natural resource benefits, including retaining forest cover and scenery, clean water, clean air, wildlife, ecosystem diversity, and certain forms of primitive outdoor recreation. The group began by reaffirming and updating L-A-D's 1987 policy on forest management.

With its conservative philosophy of perpetual forest management in mind, the board of directors of the L-A-D Foundation adopted the recommended policy statement that "non-renewable resource extraction, such as mineral development, is not compatible with the stewardship and integrity of renewable resources and thus is not part of the purpose or function of the Forest, and not part of the mission of the Foundation. Accordingly, neither prospecting for nor extraction of minerals, including sand, gravel, rock, hydrocarbons, or ores will be permitted on Forest land or any land owned by the Foundation."



*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 carrying capacity and health of the land and water.*  
Left: A fawn takes refuge in understory flora. Right: The sun sets through a stand of shortleaf pine. NEAL HUMKE

## CARBON SEQUESTRATION ON PIONEER FOREST

Forests serve as major carbon storage reservoirs, and trees within forests are considered highly efficient in sequestering carbon. Over time, trees sequester carbon dioxide from the atmosphere and incorporate it in their biomass, storing carbon at a faster rate than they release it. Our ability to store greater amounts of carbon in forests worldwide provides a stabilizing effect against the continuing release of carbon.

The method of management on Pioneer Forest may be especially valuable in sequestering carbon. Successful management on Pioneer is defined by its continuous maintenance of an uneven-aged character. Worldwide, extending rotations (time between harvest) has been considered an important objective for retention of carbon. Uneven-aged forests are more closely concerned with canopy conditions. Unlike even-aged forests, there is no rotation since the canopy is never fully removed. A 2002 study by St. Louis University (LaVigne) estimated that on Pioneer Forest total canopy replacement occurs over a period of 189-228 years.

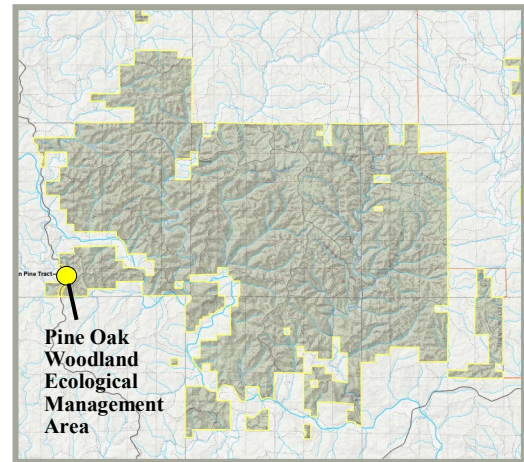
In 2018 the Foundation's board of directors approved a proposal from its Carbon Sequestration Task Force to contract with Winrock International for a study of its carbon. Winrock is a recognized leader in U.S. and international development and provides solutions to some of the world's most complex social, agricultural, and environmental challenges. The Foundation seeks to understand more about carbon sequestration on Pioneer Forest, compare that with other forested lands in the region and nation, and develop a monitoring and accounting program going forward. Research findings on Pioneer may be of value to other forestry professionals and land managers in the region.

## MISSOURI BIRD CONSERVATION INITIATIVE (MOBCI) GRANT

The MOBCI, with 73 organizations participating, granted the L-A-D Foundation and Pioneer Forest \$22,640 to assist ecological stewardship within its 688-acre shortleaf Pine-Oak Woodland Ecological Management Area near Round Spring. This area includes the historically important Virgin Pine Tract acquired from the Missouri Department of Transportation in 1996.

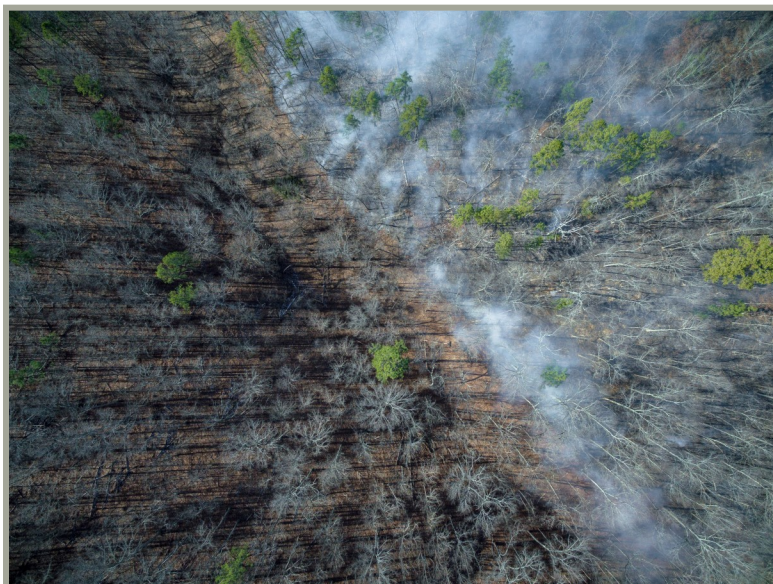
Invasive eastern red cedar will be thinned and removed from a 19-acre dolomite glade to enhance the effect of prescribed fire and recovery of the characteristic glade flora. L-A-D's seasonal crew for fall 2018/winter 2019 will conduct this work and prepare the surrounding area for prescribed burning. This treatment within the surrounding matrix will increase quality of the glade and woodland, and will benefit woodland, shrub, and glade birds.

Within the woodland management area, the largest pine trees have been core-sampled and aged at more than 230 years old. These occur within the historic pinery preserved along Highway 19. Similarly-aged monarch pine trees are scattered on the adjacent Pioneer-managed woodland. Our goal is to restore the multi-aged, native shortleaf pine mixed with oak along with associated glade flora and fauna. The use of prescribed fire here is a long-term commitment. Bachman's sparrow, bobwhite quail, blue-winged warbler, and white-eyed vireo would be expected to thrive here. This grant will be matched by \$32,000 from the L-A-D Foundation.



## NATURAL RESOURCES CONSERVATION SERVICE (NRCS) GRANT

The L-A-D Foundation received a grant from the Natural Resources Conservation Service (NRCS) in 2016 for work restoring the Randolph Tract, part of Pioneer Forest's Pine-Oak Woodland Ecological Management Area. Work under this grant was completed in 2018 after two successful prescribed burns totaling 439.5 acres (see page 19). This work will restore the natural character of the landscape, increase the prevalence of native plant species, improve habitat for native animals including bird species rare to Missouri, and improve the aesthetic of this unique area.



*A bird's eye view of a prescribed burn at the Randolph Tract, January 2018. Good fireline preparation and favorable weather conditions helped this burn go off without a hitch. The L-A-D Foundation benefits from the assistance of state and federal agency resources that join Pioneer and L-A-D Foundation staff in completing prescribed burns. Missouri University Student Association of Fire Ecology and AmeriCorps St. Louis also routinely participate.*

AERIAL DRONE PHOTO: KRISTOPHER CORBETT



## JORDAN DUBIN JOINS L-A-D AS THE FOUNDATION'S FIRST SUMMER INTERN

Jordan Dubin interned this summer at the L-A-D Foundation office in St. Louis. He completed his junior year at Washington University and spent most of his summer archiving papers; cataloging photographs, letters, awards, and old records; organizing the Pioneer Forest office library in Salem; and working on our bibliography of research information.

In St. Louis, Jordan scanned 247 historic photographs; organized, labeled, and safely stored hundreds of letters between Leo Dry and landowners regarding property acquisitions; documented the contents of Leo's old office safe; researched, read, and summarized nine potential additions to our bibliography of research involving the Foundation or Pioneer Forest. In Salem, he organized books and other publications into a working library, including a complete list of its materials. We thank Jordan for all his good work!



Above: Jordan Dubin with files organized for donation. In total, Jordan completed 25 file boxes of the Foundation's historical records.  
Far left: Correspondence from Leo Drey regarding land transactions, 1950s–1970s.  
CLARE HOLDINGHAUS-IRELAND

Center: Historical, research, and industry materials organized at the Pioneer Forest office in Salem.  
JORDAN DUBIN

## INSURANCE AND INDEMNIFICATION REVIEW

The L-A-D board of directors established a taskforce to conduct a thorough review of the Foundation's insurance plans and indemnification policies this past year. The taskforce identified several recommendations that have been incorporated for the 2018-2019 coverage year, including the addition of a fiduciary liability policy. The Foundation renewed its coverage for directors & officers liability, employment liability, and umbrella policy without significant change. The Insurance and Indemnification Taskforce continues to review indemnification issues.

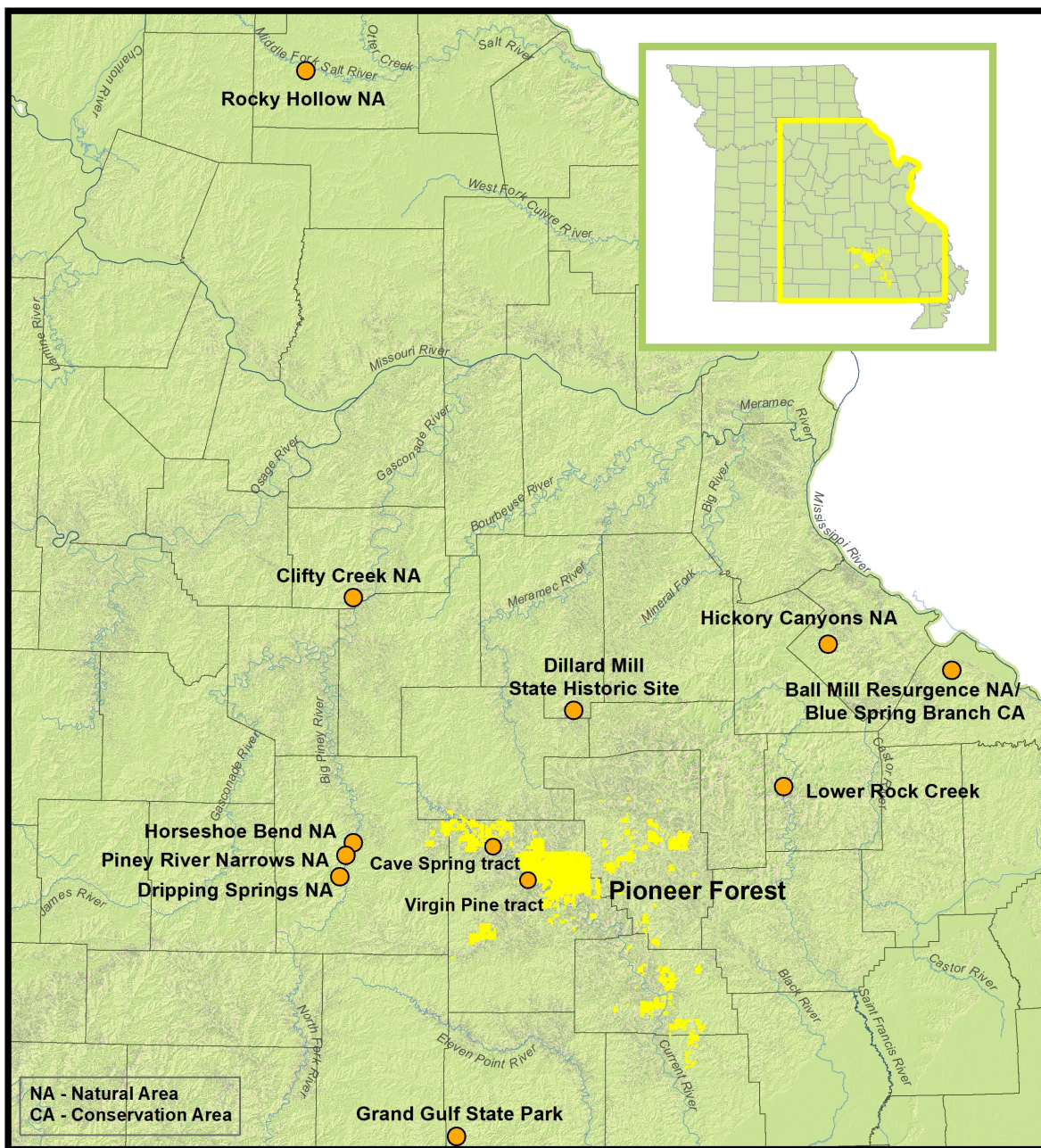
In June, the Foundation's commercial liability insurance provider informed the Foundation that due to changes in their internal policies, they could no longer insure the Foundation for prescribed burns. Since reintroduction of fire to fire-dependent natural communities is an important part of the Foundation's ecological stewardship of certain lands, it became necessary to find an insurer that could accommodate this type of activity. It was a challenge. Several factors at the state and national level have made obtaining insurance for prescribed burning more difficult in recent years. On a national level, many insurance companies have become wary of anything relating to fire. Several brokers informed Foundation staff that few insurance underwriters retain staff capable of evaluating the risks associated with prescribed burns. In the absence of expert risk assessment, these companies are primarily informed by national news relating to wildfires, and many companies have experienced significant losses associated with western wildfires in recent years. At the state level, Missouri has not defined the level of risk associated with prescribed fire. Most states have defined this by statute, and in the absence of guidance, many insurers are reluctant to insure against an "unknown" level of risk.

In spite of these challenges, the Foundation identified two insurers able to cover the whole of our operations, including timber management and prescribed burning, and renewed its coverage in September 2018.

# *Appendices*



# MAP OF L-A-D FOUNDATION LANDS



# LIST OF L-A-D FOUNDATION LANDS

<u>SPECIAL AREA</u>	<u>COUNTY</u>	<u>SPECIAL DESIGNATION</u>	<u>SIZE</u>
<b>PIONEER FOREST AND ITS SPECIAL AREAS</b>			<b>143,318.25 ACRES</b>
Blair Creek Hanging Fen	Shannon	Forest reserve, <sup>1</sup> 2011	25 acres
Bluff School, Medlock Cave	Shannon	Forest reserve, 1995	51 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, <sup>2</sup> 1955, and State Natural Area, <sup>3</sup> 1977, 10 acres; Addition, Natural Area, 2005, 255 acres; Total area	265 acres
Fishtrap Hollow and 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 Fens	Shannon	Forest reserve, 1995	140 acres
Pineknott Shortleaf Pine	Carter	Ecological management area, 2015	330 acres
Pioneer NA	Shannon	SAF Natural Area, 1964, and State Natural Area, 1977	20 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 areas, 2015	85 acres
Triple Sink/ Sunklands NA <sup>4</sup>	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
Randolph Tract Pine-Oak Woodland	Shannon	Ecological management area, 2015	500 acres

*Continued on next page.*



<u>SPECIAL AREA</u>	<u>COUNTY</u>	<u>SPECIAL DESIGNATION</u>	<u>SIZE</u>
<b><u>RIVERWAYS CORRIDOR LANDS</u></b>			<b><u>1,123.55 ACRES</u></b>
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
<b><u>LANDS LEASED TO MISSOURI DEPARTMENT OF CONSERVATION (MDC)</u></b>			<b><u>2,423.32 ACRES</u></b>
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 88.58 acres in 2018 Total acres under lease	368.39 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 1,094.34 Total acres	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
<b><u>LANDS LEASED TO MISSOURI DEPARTMENT OF NATURAL RESOURCES</u></b>			<b><u>289 ACRES<sup>5</sup></u></b>
Dillard Mill	Crawford	State Historic Site, 1977	130 acres
Grand Gulf State Park	Oregon	National Natural Landmark, <sup>6</sup> 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	
<b><u>OTHER LANDS</u></b>			<b><u>267.42 ACRES</u></b>
Lower Rock Creek	Madison	Wild land	226 acres
Virgin Pine	Shannon	Scenic remnant corridor	41.42 acres
<b>TOTAL L-A-D FOUNDATION LAND OWNERSHIP</b>			<b>147,421.57 ACRES</b>
<i>Continued from page 40. Footnotes on next page.</i>			

*Footnotes for pages 40-41:*

<sup>1</sup>The 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.

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

<sup>3</sup>The 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.

<sup>4</sup>Originally 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.

<sup>5</sup>State 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.

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

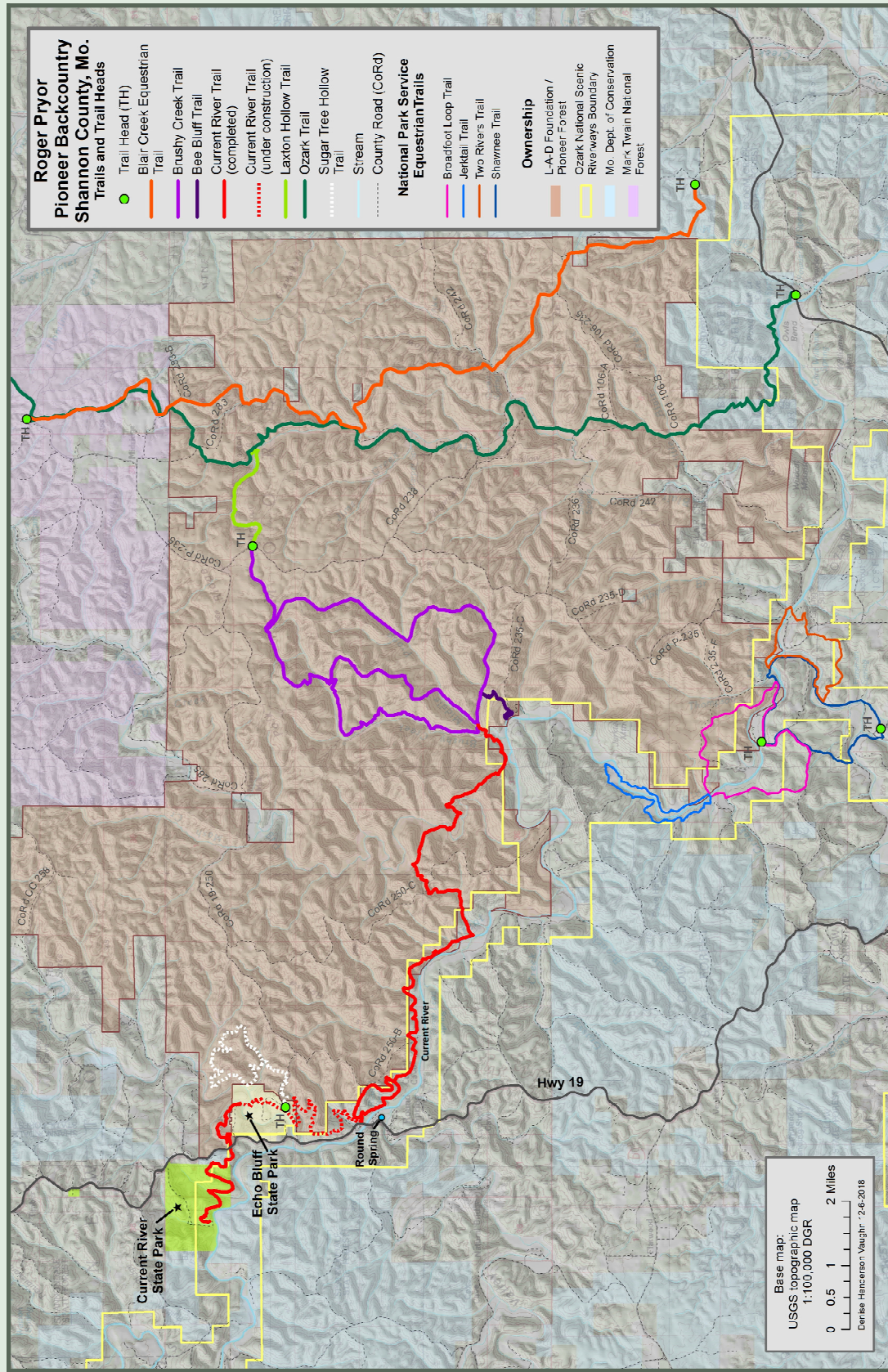


## LIST OF L-A-D FOUNDATION TRAILS

- **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 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 Forest on a route parallel to the Current River.

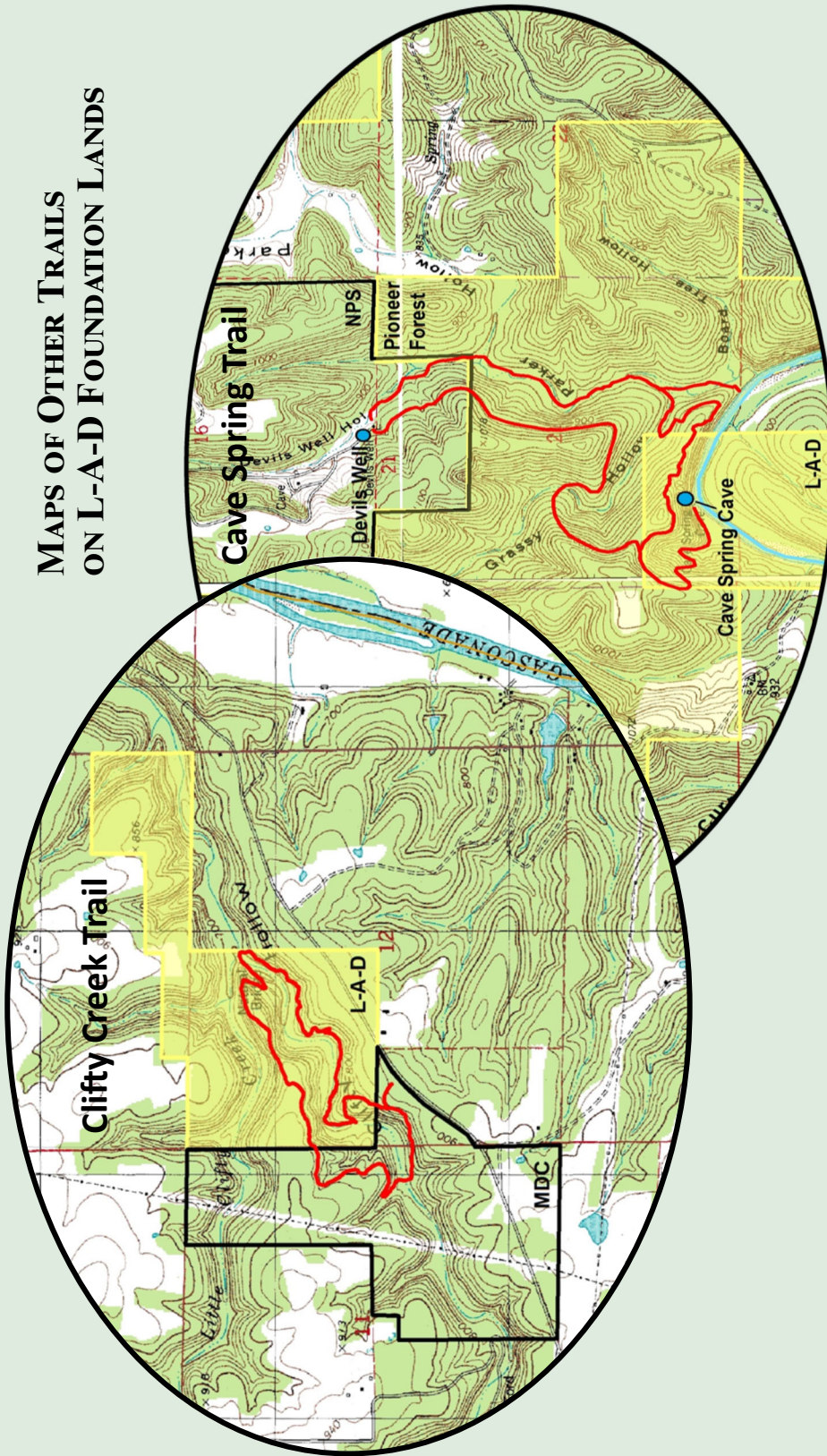
# MAP OF THE TRAILS OF THE ROGER PRYOR PIONEER BACKCOUNTRY



For access to a digital map or to review a larger image go to: [ladfoundation.org/pioneerforest/image/pryor\\_map\\_large.jpg](http://ladfoundation.org/pioneerforest/image/pryor_map_large.jpg)



## 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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#### February 2019

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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