Prescribed fires at Buffalo National River

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Identity of the organisation

Organisation: U.S. Department of the Interior, National Park Service, Buffalo National River

Website: https://www.nps.gov/fire/wildland-fire/connect/regional-programs/midwest.cfm

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Site identity

Site: Buffalo National River

Location: North Central Arkansas, Ozark Highlands Region, USA

Specificities: Eroded sandstone, limestone and dolomite and the karst geology create a rich and diverse landscape supporting a variety of plant and animal species. The oak savannas, open landscape dominated by oaks, are one of the most important landscapes in this site.

Challenges: Restoration of fire as a component of natural processes. "Mimicking nature" is the greatest challenge. Restoring oak savannas ecosystems which are fire-dependent, but have been endangered by the suppression of fire these past years. Other challenges include funding, smoke management, and public opinion.

Status: The area has been designated as a national park. Approximately 37,000 of the 100,000 acre park has additionally been designated by congress as "Wilderness". Wilderness areas are the most protected landscapes in America by law.

Areas: Woodland area, Aquatic environment (rivers), Agriculture area.

Action type: Management, Restoration or rehabilitation (towards the ecosystems historical trend or repairing key functions).

Action framework: Climate change adaptation, Management of nature areas, Risk management, Land planning, Blue and green corridors.

History and context

For thousands of years naturally and human-ignited fires have influenced the landscape of the area that is now Buffalo National River, effecting the composition, structure, and distribution of vegetation throughout the area.

But, over the past century the purposeful exclusion of fire from the landscape has caused unanticipated changes. Changes in fire frequency (less frequent fires) have allowed for encroachment of woody plants into areas which were previously sparse woodlands or glades. This leads to an increasing of tree density and to canopy closure. The increase in vegetation density also represents an unnatural accumulation of fuels, altered composition and spatial patterns of vegetation, altered succession of vegetation, and increased risk to ecological and social values within and outside of the national park. Ecological values at risk from the exclusion of fire include keystone ecosystem elements such as biodiversity, resistance, and overall ecosystem health. Social values-at-risk include life, property, and human health. For a number of reasons naturally occurring fires being allowed to burn across the landscape is not feasible. Prescribed or controlled fire is used to safely reintroduce and maintain fire as a component in natural ecological processes.

Collared Lizard. Source: National Park Service

Presentation of the project

Issues and objectives

The objectives are:

- Restore and maintain fire to naturally occurring levels as a component of ecosystem processes.
- Reduce the unnatural build-up of fuels to reduce the risk of an unplanned and possibly catastrophic wildfire.
- Restore ecosystem function to maintain and improve the habitat for a variety of native species. Species that benefit from prescribed fires include Collared lizard (*Crotaphytus collaris*), several bat species such as the Ozark big-eared bat (*Corynorhinus townsendii*) or the Indiana bat (*Myotis sodalist*), native wildflower such as Newton's Larkspur (*Delphinium newtonianum*), the Purple beardtongue(*Penstemon cobaea*), Silky aster (*Symphyotrichum sericeum*), Fringed puccoon (*Lithospermum incisum*), or bird species such as Prairie warbler (*Setophaga discolor*), Painted bunting (*Passerina ciris*), Ruby-throated hummingbird (*Archilochus colubris*), Great-

crested flycatcher (*Myiarchus crinitus)*, Pine warbler (*Setophaga pinus)*, Indigo bunting (*Passerina cyanea)*, Eastern bluebird (*Sialia sialis)*, Summer tanager (*Piranga rubra)*, Greater roadrunner (*Geococcyx californianus)*, Blue-gray gnatcatcher (*Polioptila caerulea)*, Yellow-breasted chat (*Icteria virens)*, Eastern towhee (*Pipilo erythrophthalmus)*, Field sparrow (*Spizella pusilla)* or Norther flicker (*Colaptes auratus)*. Bush's poppy mallow (*Callirhoe bushii)*, Newton's Larkspur (*Delphinium newtonianum)*, Trelease's larkspur (*Delphinium treleasei)*, Ozark Corn Salad (*Valerianella ozarkana)*, Ozark Spider Wart (*Tradescantia longipes*), Ozark trillium (*Trillium viridescens)*, *Tradescantia ozarkana, and* Purple beard-tongue (*Penstemon cobaea)* are also rare Ozark endemics that benefit from fire. Fire will also help by prevent encroachment of some non-native plants such as red cedar (*Thuja plicata)*, *Juniperus virginiana* (native tree but aggressive and has overpopulated the area) Mimosa (*Albizia julibrissin)*, Japanese Honeysuckel (*Lonicera japonica),* Tall Fescue (*Festuca arundinacea)*, Lespedeza (*Lespedeza cuneata)*, Kduzu (plants from the genus *Pueraria)*, and many others.

Creation, restoration methods

Park managers and botanists working for the Arkansas Natural Heritage Commission began to recognize that exclusion of fire from ecosystems that had evolved with fire as a natural disturbance was resulting in dramatic vegetation changes. Dendrochronology (tree ring dating) was used to establish a fire return interval for the park area. Then the current fire return interval was compared with the historic return interval to assess how significantly the fire regime had been altered by fire suppression... It was determined that the return interval had been relatively consistent from the 1600s up to the parks establishment in 1972 (about 3 to 5 years). At this point the fire return changed significantly with active suppression fire disappeared from the landscape (change in cultural values). This alteration in the fire regime allowed for encroachment of woody plants into areas which were previously sparse woodlands (oak savannas for example) or glades. The groundwater hydrologic budget also changed as more forest allows less runoff during periods of high precipitation, but also draws substantially more water from the soil horizons during periods of low precipitation. Prescribed fire is the only logical solution.

It should be noted that for some invasive plant species like the red cedar, forest managers often try to control it through slash-pile techniques: mechanical or manual cutting and then piling up of vegetation debris, and finally setting the pile on fire.

Using existing scientific information (see attached list of publications) and careful fire monitoring, prescribed fire is applied to several thousand acres annually at Buffalo National River (8,000 to 22,000 acres each year). The application of fire is conducted on predefined burn units ranging in size from 20 to more than 12,000 acres. Burn units are typically defined by pre-existing features that can be used as fire control lines such as a road or stream.

Researchers recommended frequent (2-6 years) prescribed fire application during a savanna/woodland restoration phase, then allowing occasional recruitment of oak and hickory sprouts into the canopy with burns spaced at 10-20 years.

Human and material resources

Individual treatments may be executed at any time of the year as long as fuel and weather conditions are within the fire environmental prescription perimeters listed below.

Temperature (Fahrenheit)	35° – 90°
Remative Humidity	18% – 75%
Wind direction	0 - 360

Wind Speed (Mid Flame MPH)	0 – 9	
Fuel moisture – 1 hour	5 – 10%	
Live Herbaceous Fuel Moisture	60% – 300%	
Mixing Height (minimum)	3,500 ft	3,000 ft
Transport Wind (minimum)	9 mph	10 mph

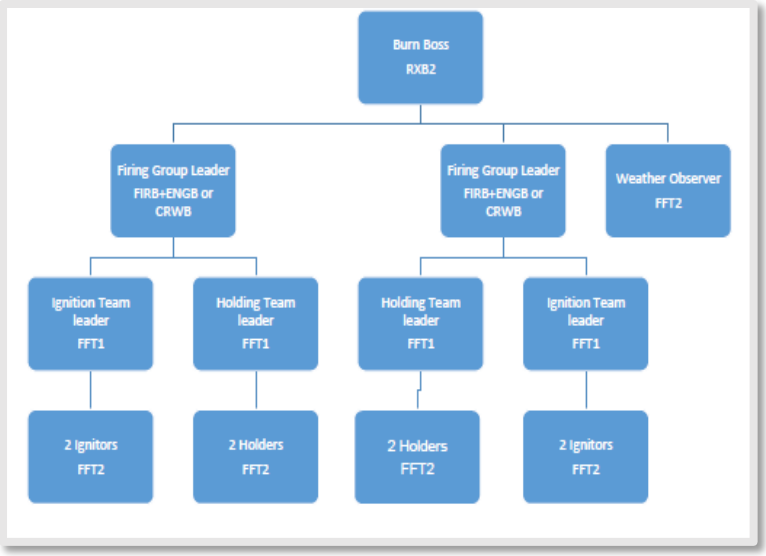
However, restrictions during events or during times of high visitor use may limit implementation. Individual treatment operations normally require 1-2 operational shift for ignitions and 1-3 operational shifts for monitoring, holding or mop-up.

All positions must meet National Wildland Fire Coordination Group Standards (www.nwcg.gov).

Generally, the minimum personnel required consist of 16 core individuals comprised of:

1 burn boss, (RXB2) 1 Firing Boss (IGSP), 2 igniters (FFT1 or 2), 1 Holding Boss (Single Resource Boss) 2 Engine Bosses (ENGB) and 9 Firefighters (FFT2). These numbers will increase as the operational complexity of the burn dictates or the number of perimeters fired increases.

Below is an example of a typical prescribed fire operation arrangement of personnel.



Typical prescribed fire operation arrangement of personnel. © Tony Collins.

All firefighters on the prescribed fire are required to have fire resistant clothing, fire pack, fire shelter, and hardhat. Equipment usually includes hand tools, gas powered leaf blowers, chainsaws, brush truck (small fire engine with 400 – 500 gallons of water) and UTVs equipped with water pump and 50 – 100 gallon water tanks.

Firing or ignition tool (©Onduso)

The type of fire used during prescribed fire is usually a "surface fire", since it increases soil fertility through converting litter into ash that immediately makes its way into the soil as nutrients. Surface fire only kills small trees with a thin cambial layer. Large trees such as black oak, with thick back, survive well under surface fire.

Surface fire at Pruitt site (©Onduso)

Usually, the Northern Forest Fire Laboratory fire model 9 is the main model used in Buffalo National River. The main characteristics are, in average (Ndar Onsuso, 2013):

— mid-flame wind speed: 5 mph
— slope: 5%
— rate of spread: 8 chains/hour (1 chain = 66 feet= 20,12 m)
— heat/unit area: 343 BTU/ft^2 (BTU: Burn unit)
— fire line intensity: 48 BTU/ft^2
— flame length: 4,8 feet.

Monitoring and evaluation methods

Vegetation is sampled prior to burning or mechanical treatment, immediately after, and at 1, 2, 5, and 10 year intervals. After collection, the data are entered into a database and stored for analysis. The data allow resource managers and scientists to compare pre- and post-burn vegetation composition and fuel loadings and assess whether burn objectives were met, and to track long-term ecosystem changes due to fire. Data is collected on the following:

- Shrub and herbaceous vegetation composition and abundance
- Tree density, diameter and health by species and size class
- Fuel load by size class (1 hr, 10 hr, 100 hr and 1000 hr fuels)
- Litter and duff depth
- Average scorch height (Post-burn)
- Percent Crown scorch (Post-burn)
- Burn Severity (Post-burn)
- Visual changes at permanent photo points

Monitoring elements were not collected on other biological compartment such as fauna, mushrooms, or soils.

- 2017 Buffalo National River Fire Effects Monitoring Report

Data analysis interpretation :

In the 9 months prior to the 2017 summer data collection, 3 woodland plots burned at BUFF in the Cecil Cove prescribed burn but no other monitoring plots. Also, a woodland plot in the Barn Bluff and a woodland plot in the Turney prescribed fire units reached the second growing season after the second burn, which is one of the written trigger points for fire effects data analysis at BUFF.

Hereunder are the 2017 fire effects objectives and monitoring results in Buffalo:

For the dry woodland for example, woodland data from 13 plots shows that it is 80% certain that at least a 60% reduction in the density of pole-sized trees will be achieved within 10 years of the initial prescribed fire. Also, woodland data from 13 plots shows that it is 90% certain that at least a 54% reduction in the number of live tree stems per acre will be achieved after 10 years of burning.

Prescribed fire in Buffalo National River (©Tony Collins)

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed (Range of data years included in analysis)
BUFF, Glade/Transition	Reduce pole density (2.5 – 15 cm dbh) by 60% after 10 years of burning; (80% Confidence Interval)	Total pole tree reduction = 20% decrease (n=8 plots, 2 fires)	No, nor can they be at this point.	2013 2001-2013
	Increase the average number of native species in the herbaceous layer by at least 40% within two growing seasons after the second burn; (90% C.I.)	No change in the average number of species (per quadrat) in the herbaceous layer. (n=8 plots with 2 burns)	No, nor can the remaining 2 glade plots awaiting burn #2 achieve the goal.	2013 2001-2013
	Reduce new growth of eastern red cedar by 95% after three consecutive burns (90% C.I.)	Reduced new growth eastern red cedar by 100% (n=1 plot with 3 burns)	Yes	2016 2001-2016
BUFF, Dry Woodland	Reduce pole-sized tree density (2.5-15 cm dbh) by 60% after 10 years of burning; (80% C.I.)	60% Reduction (C.I. 80%) (n=13 plots, 9 – 10+ years after 1st fire)	Yes	2017 2001-2017
	Reduce overstory-sized tree density to open vista with a target density of 74 trees/hectare after 20 years (80% C.I.)	345 to 335 overstory tph = 3% Reduction (n=13 plots, 9 – 10+ years after 1st fire)	NA, first burns with plots were in 2004, but reaching goal is very unlikely.	2017 No 20 yr data 2001 - 2017
	Reduce live tree stems/acre by 60 % over 10 years of burning (90% C.I.)	54% Reduction (n=13 plots, 9 – 10+ years after 1st fire)	No, because no additional burns are planned before 10 years.	2017 2001 - 2017

Two precise examples are also provided below: the last available data for Dry woodland (2017) and for Glade (2016 – No 2017 BUFF glade data was collected or due to be collected).

For each box of the tables containing results, the first data is the pre-burning data, and the second is the post latest burn data (dates of burns are in the third column).

BUFF Plot Type & #	Burn Unit	Dates of burns	Written goal is 60% reduction of pole-sized trees (2.5-15cm dbh) per hectare after 10 yrs of burning (with a statistical confidence interval of 80%)	Woodland plots had no goal established for increasing the avg # of native herbaceous species. Latest data.	Written goal is to reduce tree density to open vista with a target density of 74-126 overstory-sized trees per hectacre after 20 yrs (80% C.I.)
Dry woodland 1	LBW	3/10/04, 3/30/07, plot did not burn in 13,	From 2280 to 1240 = -46%	From 1.9 to 3.5 = up 84%	From 210 to 210 = no change
Dry woodland 2	LBW	3/10/04, 3/30/07, 3/6/13,	2480 to 570 = -77%	1.3 to 6.9 = up 431%	270 to 310 = +15%
Dry woodland 3	LBW	3/10/04, 3/30/07, 3/6/13,	1760 to 320 = -82%	0.8 to 3 = up 275%	370 to 330 = -11%
Dry woodland 4	LBW	3/10/04, 3/30/07, plot did not burn in 13,	1560 to 600 = -62%	1.4 to 5.2 = up 271%	510 to 530 = +4%
Dry woodland 5	LBW	3/10/04, 3/30/07, 3/6/13,	2240 to 1200 = -46%	2.1 to 5.7 = up 171%	240 to 320 = +33%
Dry woodland 6	LBW	3/10/04, 3/30/07, 3/6/13,	1800 to 400 = - 78%	0.5 to 4 = up 700%	230 to 240 = +4%
Dry woodland 7	LBW	3/10/04, 3/30/07, plot did not burn in 13,	1680 to240 = -86%	1.8 to 2.9 = up 61%	170 to 160 = -6%
Dry woodland 8	Pruitt	3/14/05, 3/28/12, 3/22/14, 10/15/15,	1200 to 280 = -77%	4.1 to 10.9 = up 166%	360 to 260 = -28%
Dry woodland 9	Riddell	3/3/05,	1720 to 1760 = +2%	8.6 to 6.1 = down 29%	300 to 300 = no change
Dry woodland 10	Riddell	3/3/05,	1520 to 1440 = -5%	2.5 to 1.9 = down 24%	530 to 520 = -2%
Dry woodland 11	Cecil Cove	11/11/09, 1/31/17	800 to 720 = -10%	2.9 to 8.2 = up 183%	310 to 320 = +3%
Dry woodland 12	Cecil Cove	11/11/09, 1/31/17	1680 to 1240 = -26%	7.3 to 15.1 = up 107%	300 to 310 = +3%
Dry woodland 13	Cecil Cove	11/11/09, 1/31/17	800 to 880 = +10%	2.9 to 5.7 = up 97%	290 to 240 = -17%

Dry woodland 14	Turney	11/19/08, did not burn in 11 or 12, 1/28/16,	1680 to 480 = -71%	2.5 to 9 = up 260%	420 to 390 = -7%
Dry woodland 15	Turney	11/19/08, WF-4/9/11, WF-3/2/12, 1/28/16	360 to 200 = -44%	0.7 to 2.9 = up 314 %	530 to 430 = -19%
Dry woodland 16	Barn Bluff	Plot has not burned	1160 to? = ?	2.4 to ? = ?	350 to? = ?
Dry woodland 17	Barn Bluff	11/20/08, WF-2/14/16,	440 to 400 = -9%	1 to 3.3 = up 230%	340 to 360 = +6%
Average results			Avg for latest data from 16 burned plots for all poles went from 1498 to 751 = decline of 50%	Avg for latest data from 16 burned plots went from 2.6 to 5.9 = up 123%	Avg for latest data from 16 burned plots went from 336 to 327 = decline of 3%

Table 1: 2017 BUFF dry woodland fire management. Results from individual plots.

BUFF Plot Type & #	Burn Unit	Dates of burns	% reduction of pole-size trees per hectare based on latest data (goal is at least a 60% reduction after 10 yrs of burns)	% increase in avg # of native herbaceous species (based on latest data)	% reduction of eastern red cedar seedlings (goal is at least a 95% reduction after 3 burns)
Glade 1	Lower Buff Wilderness	3/10/04, 3/30/07, plot did not burn in 13,	From 2520 to 2000 = -20%	From 6 to 8.2 = up 37%	From 2 to 0 = -100%
Glade 2	Lower Buff Wilderness	3/10/04, 3/30/07, 3/6/13,	2640 to 2040 = -23%	6 to 9.4 = up 57%	0 to 0 = null
Glade 3	Lower Buff Wilderness	3/30/07, Plot did not burn in 04 or 13	1320 to 1200 = -9%	Only burned once 7.2 to 5.6 = down 22%	73 to 0 = -100%
Glade 4	Lower Buff Wilderness	3/10/04, 3/30/07, plot did not burn in 13,	720 to 520 = -28%	5.2 to 4.6 = down 12%	1 to 0 = -100%
Glade 5	Lower Buff Wilderness	3/10/04, 3/30/07, plot did not burn in 13,	840 to 880 = +5%	10 to 9.8 = down 2%	1 to 0 = -100%
Glade 6	Lower Buff Wilderness	3/10/04, 3/30/07, plot did not burn in 13,	2040 to 1760 = -14%	3.6 to 6.2 = up 72%	0 to 0 = null
Glade 7	Lower Buff Wilderness	3/30/07, Plot did not burn in 04 or 13	640 to 560 = -12%	Only burned once 5.4 to 4.6 = down 15%	5 to 0 = -100%
Glade 8	Lower Buff Wilderness	3/10/04, 3/30/07, plot did not burn in 13,	1320 to 920 = -30%	7.2 to 6.6 = down 8%	2 to 0 = -100%
Glade 9	Pruitt	3/14/05, 3/28/12, did not burn in 14 or 15	1360 to 200 =-85%	7.4 to 7.2 = down 3%	3 to 1 = -67%
Glade 10	Pruitt	3/14/05, 3/28/12, did not burn in 14, 10/15/15,	720 to 280 = -61%	5.4 to 15.6 = up 189%	18 to 0 = -100%
Average results			10 plot avg for all pole trees went from 1412 to 1036 = decline of 27%	10 plot native herbaceous species avg went from 6.3 to 7.8 = increase of 23%	10 plot avg went from 10.5 cedar seedlings per subplot to 0.1 = decline of 99%

Table 2: 2016 BUFF glade fire management. Results from individual plots.

In 2017 at BUFF, data from two customized fire effects monitoring plots established to monitor changes in a population of the nationally-rare and fire-benefitted Bush's poppy mallow (Callirhoe bushii) in the North River Road prescribed fire unit were also collected.

In 2017, the 2 plots of Bush's poppy mallow had total populations that remained above the 2014 total, (Erreur ! Source du renvoi introuvable.). However, the Plot #1 data compared to data initially collected in 2012 showed the Bush's poppy mallow population is still struggling to produce reproductive-sized plants, presumably due to a combination of excessive shade and herbivory by deer or elk.

Plot #2's 49 reproductive stems in 2017 is almost double the 26 counted there last year. While this is great news there was no obvious reason for this increase.

Prescribed fire in Buffalo National River (©Tony Collins)

Buffalo National River *Callirhoe bushii* (CABU4) data from North River Road prescribed burn unit											
Year & CABU4 plot #	Healthy Seedlings	Stressed Seedlings	Stress code*	Stems Healthy Vegetative	Stems Stressed Vegetative	Stress code*	Stems Healthy Reproductive	Stems Stressed Reproductive	Stress code*	Total for plot	Total for year
2012 plot #1	11	0		1	0		4	18	DH=18	34	
No 2013 visit											
2014 plot #1	23	20	DH=19 IH=1	0	0		0	0		43	
2014 plot #2	10	23	DH=23	0	9	DH=9	0	2	DH=2	44	87
2015 plot #1	92	54	DH=29 IH=18 BT=4 MD=3	0	9	DH=9	0	0		155	
2015 plot #2	78	20	DH=8 IH=12	2	11	DH=11	1	2	DH=2	114	269
2016 plot #1	10	19	DH=18 IH=1	0	1	DH=1	1	7	DH=7	38	
2016 plot #2	35	2	DH=2	1	0		14	12	DH=12	64	102
2017 plot #1	28	8	DH=8	1	0		5	9	DH=8 BT=1	51	
2017 plot #2	18	2	DH=2	1	0		47	2	DH=2	70	121
* Stress codes are used when ≥ 10% of a plants total leaf area is affected. DH = deer or elk herbivory, GH = groundhog herbivory, IH = invertebrate herbivory (snail, insect, etc.), PM = powdery mildew, BT = black tip (viral wilt, fungus, drought, or any other factor causing an unbrowsed stem to wither), HD = hail damage, MD = mechanical damage (falling tree limbs, walked on, etc.).											

Tableau 3: Bush's poppy mallow in North River Road prescribed fire unit.

The study led by Onduso (Onduso, 2013) for his research project on prescribed fire in five different sites of the Buffalo National River showed also several results (in the specific context of the study):

- There were more oaks and hickories in burned than in unburned sites (probably because fire opens up forest floor)

- Prescribed burning encourages the development of undergrowth

- The average tree height (m), tree basal area (m^2/ha), and tree volume (m3/ha) were higher in burned sites

- Soil nutrients that had higher values in unburned study sites were phosphorus (P), Bray II P, calcium (Ca), and potassium (K), while total exchangeable nitrogen released per acre was higher in burned study sites. Iron

ion values were lower in the burned study sites, probably due to its rapid uptake by fast-growing herbaceous species that need it as a nutrient

- Fire had both positive and negative effects to both the biotic and abiotic environment. Among the negative points: at the

Buffalo National River, fresh wood cavities made by woodpeckers were found only in unburned sites. Moreover, there were some rare plant species encountered in the unburned study sites. Two of these were leatherwood (*Dirca palustris* L.) and rattlesnake plantain (*Goodyera pubescens* [Willd.] R. Br.)

- Fire encouraged the establishment of some species such as the fungi *Biscogniauxia mediterranea* (De Not.) Kuntze and *Valsa ceratosperma* (Tode) Maire that were present only in burned study sites, but discouraged other species

Description

Facilitation

It is required to develop a comprehensive Fire Management Plan with associated environmental compliance documentation for the park unit, a programmatic or park wide prescribed fire plan, and an incident action plan (IAP) for each prescribed fire burn operation. The IAP contains several individual plans (Ignition plan, holding plan, staffing and assignment plan, communications plan, medical plan) as well as burn unit specific safety and protection considerations. Reporting via national web-based programs is required both before and after implementation.

Partners

— Technical and Scientific: US Forest Service, The Nature Conservancy, Several Universities, local and state agencies.

— Financial: Most of the funding is federal dollars allocated annually by the US Congress to the National Inter agency Fire Centre (NIFC). NIFC distributes the funding by agency to regional offices who distribute the funds to local fire management offices such as the Arkansas National Parks Fire management Group.

Prescribed fire in Buffalo National River (©Tony Collins)

Costs and financing

It is difficult to estimate the exact cost of completing a prescribed fire projects. However a reasonable figure would be from $50 to $250 per acre.

Timetable

ACTION TIMETABLE			
Year 1	Year 2 - 3	Year 3 -4	8 – 10 years
Project area is identified	Pre burn monitoring data is collected	Project is entered into National Fire Plan Operations and Reporting System (NFPORS) Funding is requested	Burn plan is updated
Area is mapped or a GIS layer file(s) are created	Monitoring plots are installed	Prescribed Fire Burn Plan is completed	Burn plan is tech reviewed, and reviewed and approved by regional fire staff.
Project area is reviewed by Resource Management Staff	Cultural and natural resource field surveys are initiated.	Burn plan is tech reviewed, and reviewed and approved by regional fire staff.	
Project area is reviewed by Fire Management Staff	Cultural and natural resource field survey reports are completed	Compliance packages are prepared and submitted for regional, state, federal, and Native American tribal review and approval	Compliance is reviewed and submitted for regional state, federal, and Native American tribal review and approval
Project area is reviewed by local Cultural Resources staff	Depending on the area and type of burn, public meetings or field trips may occur.	An Incident Action Plan is developed for the burn. Any on site pre-burn preparations are completed.	An Incident Action Plan is developed for the burn. Any on site pre-burn preparations are completed.
Site specific data is gathered prior to initiating compliance.	Research needs are established, and partners are identified	The unit is burned	
Data gaps and site specific information needs are identified	Research and data collection continue	Post burn fire effects monitoring data is collected GIS data is submitted for completed area. Fire reports are entered into the Wildland Fire Management Information database.	

Overall assessment

STRONG POINTS	WEAK POINTS
— A natural process — Fire crews are trained and have a strong experience — Actions are based on scientific information	— Emissions of CO2 and other particles that can be harmful to human health when inhaled — Some points related to social acceptance (see below).
IMPROVEMENTS - ADVISES	
— Base any and all actions on the best available science and as much research as possible.	

- Social acceptance

The social dynamics of prescribed burning are extensive and can be very emotional.

A project led in 2006 aimed at identifying and addressing the social constraints to the use of prescribed fire in the Ozark and Ouachita National Forests of Arkansas (Creighton and al., 2006). In order to identify the issues, a series of focused discussions were held at 6 locations across the state, with participants representing a wide range of stakeholders. Discussions were intended to identify barriers surrounding the use of prescribed fire in forest management. Three main issues which impact land manager's ability to burn were identified by participating stakeholders: risk, smoke, and public perception.

Smoke from prescribed fires was one of the foremost issues mentioned by stakeholders. Primarily, stakeholders indicated that they were concerned with the impacts of smoke on visibility, health and air quality. The effect of smoke on human health was a predominant point of discussion during all meetings.

Stakeholders named numerous potential risks associated with the use or lack of use of prescribed fire. Participants noted that there is a risk of litigation involved with the application of prescribed fire. Land managers voiced concerns about unintended visibility problems created by smoke which settles over high traffic areas such as highways and airports. For others, the risk of a prescribed fire becoming a wildfire and the potential damage to property, life, biota and ensuing litigation was of great concern. Likewise, the risk of ecosystem damage through fire suppression and the increased risk of catastrophic wildfire due to the lack of controlled burning were also mentioned by some participants.

Participants also articulated a concern about the public perception of prescribed fires in Arkansas. The participants perceived a difference between rural and urban communities regarding the acceptance of controlled burning, with rural communities having a higher degree of acceptance. They suggested that these differences would become more polarizing as urban sprawl increases in the rural areas of Western and Northern Arkansas.

Perspectives

Continuation

It is anticipated that the project will continue. Of course all work is dependent upon funding.

Transposability

It is accepted as an approach to fire as a part of restoration ecology. The application of prescribed fire to restore and maintain ecological health has been proven on private and public lands across the U.S. and in many locations worldwide. The general process is transferable. Adjustments may be necessary depending on level of expertise, risk, fuel model, topography, and climate.

Prescribed fire in Buffalo National River (©Tony Collins)

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