## CFLR Project (Name/Number): Missouri Pine-Oak Woodlands Restoration Project CFLN20

***National Forest(s): Mark Twain National Forest***

## 1. Match and Leveraged Funds:

### a. FY19 Matching Funds Documentation

| Fund Source – (CFLN/CFLR Funds Expended) | Total Funds Expended in Fiscal Year 2019 |
|---|---|
| CFLN19 | $652,431.69 |

This amount should match the amount of CFLR/CFLN dollars obligated in the FMMI CFLRP expenditure report. Include prior year CFLN dollars expended in this Fiscal Year.

| Fund Source – (Funds expended from Washington Office funds (in addition to CFLR/CFLN) (please include a new row for each BLI)) | Total Funds Expended in Fiscal Year 2019 |
|---|---|
| NFVW | $473,825.00 |

This value (aka "core funds" "in lieu of funds") should reflect the amount expended of the allocated funds as indicated in the program direction but does not necessarily need to be in the same BLIs or budget fiscal year as indicated in the program direction.

| Fund Source – (FS Matching Funds (please include a new row for each BLI) | Total Funds Expended in Fiscal Year 2019 |
|---|---|
| CMRD | 13,304.36 |
| CWKV | 125,988.57 |
| NFHF | 174,472.84 |
| NFTM | 164,539.36 |
| NFVW | 186,231.57 |
| NFWF | 60,427.54 |
| RTRT | 16,800.00 |

This amount should match the amount of matching funds in the FMMI CFLRP expenditure report, minus the Washington Office funds listed in the box above and any partner funds contributed through agreements (such as NFEX, SPEX, WFEX, CMEX, and CWFS) listed in the box below.

| Fund Source – (Funds contributed through agreements) | Total Funds Expended in Fiscal Year 2019 |
|---|---|
| | $0 |

Please document any partner contributions to implementation and monitoring of the CFLR project through an income funds agreement (**this should include partner funds captured through the FMMI CFLRP reports such as NFEX, SPEX, WFEX, CMEX, and CWFS**). Please list the partner organizations involved in the agreement. Partner contributions for Fish, Wildlife, Watershed work can be found in the WIT database.

| Fund Source – (Partner In-Kind Contributions) | Total Funds Expended in Fiscal Year 2019 |
|---|---|
| Northern Research Station – Bird Modeling and Monitoring | $ 19,400 |
| University of Missouri | $24,300 |

Total partner in-kind contributions for implementation and monitoring of a CFLR project on NFS lands. Please list the partner organizations that provided in-kind contributions.

| **Service work accomplishment through goods-for services funding within a stewardship contract (for contracts awarded in FY19)** | **Totals** |
|---|---|
| Total revised non-monetary credit limit for contracts awarded in FY19 | $0 |

Revised non-monetary credit limits should be the amount in contract's "Progress Report for Stewardship Credits, Integrated Resources Contracts or Agreements" in cell J46, the "Revised Non-Monetary Credit Limit," as of September 30. Additional information on the Progress Reports is available in CFLR Annual Report Instructions document. Information for contracts awarded prior to FY19 were captured in previous annual reports.

**b. Please fill in the table describing leveraged funds in your landscape in FY2019**. Leveraged funds refer to funds or in-kind services that help the project achieve proposed objectives but do not meet match qualifications.

2. Please tell us about the CFLR **project's progress to date in restoring a more fire-adapted ecosystem as described in the project proposal**, and **how it has contributed to the wildland fire goals in the *10-Year Comprehensive Strategy Implementation Plan***.

Restoring the fire adapted ecosystem towards FRCC1 from FRCC2 and FRCC3 status is being accomplished with a combination of prescribed fire on a 2-5 year interval and understory thinning to reduce canopy cover and increase understory vegetation. See 2019 Ecological Indicator report.

**FY2019 Overview**

| **FY19 Activity Description (Agency performance measures)** | **Acres** |
|---|---|
| Number of acres treated by prescribed fire | 12,310 |
| Number of acres treated by mechanical thinning | 7,431 |
| Number of acres of natural ignitions that are allowed to burn under strategies that result in desired conditions | 0 |
| Number of acres treated to restore fire-adapted ecosystems which are maintained in desired condition | 12,310 |
| Number of acres mitigated to reduce fire risk | 19,741 |

**Please provide a narrative overview of treatments completed in FY19**, including data on whether your project has expanded the pace and/or scale of treatments over time, and if so, how you've accomplished that – what were the key enabling factors? ***For projects finishing their tenth year***, if you have any additional insights from your cumulative work over the course of the project please share those here as well.

- **How was this area prioritized for treatment?** What kinds of information, input, and/or analyses were used to prioritize? Please provide a summary or links to any quantitative analyses completed.
  Priority landscape per Forest Plan 1.1and 1.2 Ecosystem Restoration Areas and designated State Conservation Opportunity Area for Forest/Woodlands and Glades.

- **Please tell us whether these treatments were in "high or very high wildfire hazard area** from the "wildfire hazard potential map" (https://www.firelab.org/project/wildfire-hazard-potential)
  No. Very Low/ Low Hazard area.

- Were the treatments in **proximity to a highly valued resource** like a community, a WUI area, communications site, campground, etc.?
  Yes, in proximity to numerous identified WUI's and infrastructure.

- **What have you learned** about the interaction between treatment prioritization, scale, and cost reduction? What didn't work? Please provide data and further context here.
  The forest, overall, has learned that larger scale burns are more cost effective, and this applies to the CFLR prescribed burn units.

**Please provide visuals if available**, including maps of the landscape and hazardous fuels treatments completed, before and after photos, and/or graphics from fire regime restoration analysis completed locally. You may copy and paste these below or provide a link to a website with these visuals.

**Expenditures**

| **Category** | **$** |
|---|---|
| FY2019 Wildfire Preparedness[1] | 21,000 |
| FY2019 Wildfire Suppression[2] | 43,500 |
| The cost of managing fires for resource benefit if appropriate (i.e. full suppression versus managing) | N/A |
| FY2019 Hazardous Fuels Treatment Costs (CFLN) | 196,763 |
| FY2019 Hazardous Fuels Treatment Costs (other BLIs) | 24,6200 |

| | |
|---|---|
| CMKV:2,829 | $150.00/ac |
| CFLN: 780 | $251.00/ac |
| XXXX: 3140 | Sales/Prep Cost |
| NFHF: 12310 | $20/ac |

**How may the treatments that were implemented contribute to reducing fire costs?** If you have seen a reduction in fire suppression costs over time, please include that here. ***For projects finishing their tenth year***, if you have any additional insights from your cumulative work over the course of the project please share those here as well.

**Have there been any assessments or reports conducted within your CFLRP landscape that provide information on cost reduction, cost avoidance, and/or other cost related data as it relates to fuels treatment and fires?** If so, please summarize or provide links here: No assessments or reports to provide information on cost related data.

***When a wildfire interacts with a previously treated area within the CFLR boundary:***

*If additional assessments have been completed since the FY2018 CFLRP annual report on fires within the CFLRP area, please note that and provide responses to the questions below.* ***For projects finishing their tenth year****, if you have any additional insights from your cumulative work over the course of the project please share those here as well.*

***No additional assessments have been completed since FY2018.***

Each unit is required to complete and submit a standard fuels treatment effectiveness monitoring (FTEM) entry in the FTEM database (see FSM 5140) when a wildfire occurs within or enters into a fuel treatment area. **For fuel treatment**

[1] Include base salaries, training, and resource costs borne by the unit(s) that sponsors the CFLRP project. If costs are directly applicable to the project landscape, describe full costs. If costs are borne at the unit level(s), describe what proportions of the costs apply to the project landscape. This may be as simple as Total Costs X (Landscape Acres/Unit Acres).

[2] Include emergency fire suppression and BAER within the project landscape. Describe acres of fires contained and not contained by initial attack. Describe acres of resource benefits achieved by unplanned ignitions within the landscape. Where existing fuel treatments within the landscape are tested by wildfire, summary and reference the fuel treatment effectiveness report.

**areas within the CFLR boundary, please copy/paste that entry here and respond to the following supplemental questions. Note that the intent of these questions is to understand progress as well as identify challenges and what didn't work as expected to promote learning and adaptation.**

No FTEM report available.

3. **What assumptions were used in generating the numbers and/or percentages you plugged into the TREAT tool**? Information about Treatment for Restoration Economic Analysis Tool inputs and assumptions available here.

The inputs used in generating the number and/or percentages for CFLR/N and all matching funds are derived from WorkPlan and expenditure reports (transaction register). Product distributions were generated from TIMs cut and sold report.

**FY 2019 Jobs Supported/Maintained (FY19 CFLR/CFLN/ WO funding):**

| FY 2019 Jobs Supported/Maintained | Jobs (Full and Part-Time) (Direct) | Jobs (Full and Part-Time) (Total) | Labor Income (Direct) | Labor Income (Total) |
|---|---|---|---|---|
| Timber harvesting component | 42 | 62 | 1,805,443 | 2,052,355 |
| Forest and watershed restoration component | 2 | 3 | 30,579 | 40,848 |
| Mill processing component | 97 | 157 | 3,852,078 | 5,923,828 |
| Implementation and monitoring | 5 | 7 | 288,155 | 325,867 |
| Other Project Activities | 0 | 0 | 0 | 0 |
| **TOTALS:** | **147** | **229** | **5,976,255** | **8,342,899** |

**FY 2019 Jobs Supported/Maintained (FY19 CFLR/CFLN/ WO and matching funding):**

| FY 2019 Jobs Supported/Maintained | Jobs (Full and Part-Time) (Direct) | Jobs (Full and Part-Time) (Total) | Labor Income (Direct) | Labor Income (Total) |
|---|---|---|---|---|
| Timber harvesting component | 42 | 62 | 1,805,443 | 2,052,355 |
| Forest and watershed restoration component | 5 | 6 | 55,224 | 88,833 |
| Mill processing component | 97 | 157 | 3,852,078 | 5,923,828 |
| Implementation and monitoring | 6 | 7 | 283,447 | 320,543 |
| Other Project Activities | 0 | 0 | 0 | 0 |
| **TOTALS:** | 150 | | 5,996,193 | 8,385,560 |

4. **Describe other community benefits achieved and the methods used to gather information about these benefits**. **How has CFLR and related activities benefitted your community from a social and/or economic standpoint?** (Please limit answer to two pages).

The Missouri Pine-Oak Restoration Project is slated for implementation across 126 thousand acres within the Mark Twain National Forest (MTNF). This area corresponds to about 8% of MTNF. About $20 million will be invested to implement the project with one half funded through the CFLRP national fund and the other half through the Knutson-Vandenberg Fund and nongovernmental sources. The $20 million invested on MTNF-CFLRP implementation over the 2012-2019 period are expected to support an average of 141 jobs, generate $33.7 million in labor income and contribute $44.2 million in added value to the regional 9-county economy. Merchantable tree volume at the end of this period is

expected to exceed the initial amount by 14% although growth in timber volume will be lower than if the MTNF-CFLRP had not been implemented. Given the size and scope of the MTNF-CFLRP there were no sizeable or discernable negative effects to the local wood products industry although impacts on industry segments will need further evaluation.

Highlights

- Lands managed under the Mark Twain National Forest Collaborative Forest Land Restoration Project (MTNF-CFLRP) represent about 0.8% of all Missouri forests and 8% of lands in the Mark Twain National Forest.
- Results from economic and vegetation models show that total MTNF-CFLRP investments and subsequent implementation activities from 2012 to 2019 will likely result in:
    - annual average of 141 jobs supported, $33.7 million in labor income, and $44.2 million in added economic value to the local economy (nine-county region where the project is expected to have its largest impact)
    - $2.2 dollars added to the local economy for every dollar invested
    - 9.2 million in tax revenues
- Merchantable tree volume by the end of 2019 is estimated to be 14% greater with the implementation of the MTNF-CFLRP as compared to initial conditions.

| **Indicator** | **Brief Description of Impacts, Successes, and Challenges** |
|---|---|
| # Cross-institutional agreements/policies | The Forest has a Challenge Cost Share Agreement with Missouri State University and has financial arrangements with the Northern Research Station for assistance in monitoring. |
| % Locally retained contracts | All timber sales, timber marking contracts, invasive species treatment contracts have been to local contractors within the State. |
| Ease of doing business | CFLN and the required matching has allowed for more personal, flexibility in contracting and agreements. |
| Relationship building/collaborative work | The Forest has had over 20 executed Wyden Amendments Participating Agreements to conduct prescribed fire on private lands adjacent to Forest Service lands. |

5. Based on your project monitoring plan, **describe the multiparty monitoring process. You may simply reference your ecological indicator reports here if they adequately represent your multiparty monitoring process**. If further information is needed, please answer the questions below.

The Forest has a variety of collaborators assisting with multi-party monitoring with Central Hardwood Joint Ventures, The Nature Conservancy, Missouri State University Ozarks Environmental and Water Resources Institute, University of Missouri, NatureCite and Northern Research Station.

Bird Monitoring

The Missouri Pine-Oak Woodland Restoration Project implemented bird monitoring to 1) determine changes in abundance in response to restoration activities in the cooperative forest landscape restoration projects (CFLR) and 2) determine relationships between bird abundance and vegetation structure and composition in the Mark Twain National Forest. Objective 1 will require bird surveys spaced over the duration of the project. However, initial results from objective 2 will be available after 3 years based on the current variation in structure and management that has already taken place.

Please refer to 2013 – 2018 annual reports for details.

Melissa Roach, a University of Missouri graduate student monitored bird response and has found pine- savanna and woodland restoration is benefiting nesting success of multiple species and guilds and is providing additional, possibly critical, habitat for declining early-successional species and species of concern. The positive relationship with focal species' nest success and densities provides even stronger inference that pine-savanna and woodland restoration is benefitting some bird species of concern. Management activities are effectively creating the necessary vegetation characteristics to attract focal species and these species are successfully nesting in these areas (Melissa Roach 2018).

The Forest is collaborating with Northern Research Station, Missouri Department of Conservation and Central Hardwoods Joint Ventures in modeling habitat. This is being done to determine the possibility and practicality of re-introducing Brown-headed nuthatch to the CFLRP project area. In 2019, MTNF hosted a field tour with partners from Missouri Department of Conservation, Northern Research Station, Central Hardwoods Joint Venture, and American Bird Conservancy to visit restoration areas within the CFLRP footprint that could be suitable in the future for BHNU reintroductions.

Brown-headed nuthatches (Sitta pusilla; BHNU) are a non-migratory resident bird of pine woodlands that were extirpated from Missouri in the late nineteenth century when pine forests were logged. There is growing interest in the reintroduction a brown-headed nuthatch to Missouri because of an increasing focus on pine woodland management in Missouri over this timeframe and current partner support.

The opportunity to reintroduce BHNU in Missouri is driven primarily by the renewed availability of habitat. The Mark Twain National Forest, and Missouri Department of Conservation (MDC) have been focusing on management of pine woodland natural communities across the Ozark Highlands through forest harvest and burning. These two agencies and additional partners are collaborating on the Missouri Pine-Oak Woodland Restoration Project, which is supported by the USFS Collaborative Forest Landscape Restoration Program (CFLRP). The project area in the CFLRP project includes 345,710 acres of public land across the Ozarks with 115,860 planned pine-oak woodland restoration treatment acres, which includes 15,500 acres on MDC lands (Angeline, Peck Ranch, Rocky Creek, and Sunklands Conservation Areas) and 88,400 acres on MTNF.

In 2018, we assessed the suitability of pine woodlands in the Ozark Highlands to help inform decisions and any future effort regarding the reintroduction of the BHNU in the region. We reported on 1) the use of Forest Service count data to develop a habitat model from existing populations of BHNU to understand the landscape and forest stand characteristics that will be important for BHNU habitat in Missouri; and 2) the application of the habitat model to the CFLRP site and surrounding Ozarks landscape to map current habitat suitability to identify potential release sites. Our modeling demonstrated effects of compositional and structural variables, related to pine woodlands, on BHNU abundance. Application of the model to remote sensing data across the Ozarks indicated that in addition to the Ouachita National Forest, the landscapes in the Current River Hills subsection, including sections of the CFLRP sites in the Mark Twain National Forest currently provide some level of habitat for BHNU (Figure 1).

Following this initial assessment, we expanded our modeling efforts to better gauge the effectiveness of a reintroduction. Our initial habitat model (hereafter the "Landbird model"), which was based on the USFS's Landbird Monitoring Program data, had yet to be validated. This was important given that Landbird Monitoring occurs later in spring after the BHNU breeding season when this species is less detectable. In addition, it did not model density and thus allow estimation of potential source population sizes or carrying capacity of target sites. Therefore, beginning in 2019, we conducted additional point count sampling in the Ouachita National forest (a potential source population) to validate the Landbird model and develop a more up-to-date model that would provide density and population size estimates.

Our sampling expanded beyond the Landbird data and collected samples at the time of year when these birds are most detectable and using protocols that allowed us to estimate density. In March we conducted BHNU points counts in the Ouachita National Forest. Similar to the original Landbird habitat model, we fit a Bayesian-hierarchical, time-removal model to the count data. We then applied the validation model to the Landbird model predictions to estimate the size of the BHNU population in Ouachita National Forest and the potential size that could be supported on the two release sites on the Mark Twain National Forest.

The validation model converged and the Landbird habitat model predictions were a significant and positive predictor of density at point counts, thus validating the original model. However, estimated abundances at points where 25-50% higher based on the new data then from Landbird estimates, confirming that sampling during the BHNU season improves accuracy. We estimated densities of BHNU on the Ouachita National Forests between 0.5-2 birds/hectare. Based on the validation model we estimated a population of 21,018 BHNU in the Ouachita National Forest.

We also estimate that the MTNF CFLRP sites can support more than 1,000 BHNU, assuming habitat as indicated by remote sensing (Figure 1). Ongoing efforts will continue with the Missouri habitat analysis. Specifically, we will apply these new models to the newly modeled LIDAR data and Landis Outputs to estimate how many brown-headed nuthatch can be sustained currently and under the CFLRP management.

We will also build on those efforts to begin modeling source and target populations under different reintroduction scenarios. This will give us an informed idea of how to implement the process as well as an expectation of what success looks like. For example, we will use current habitat data in the MTNF to identify suitable release sites.

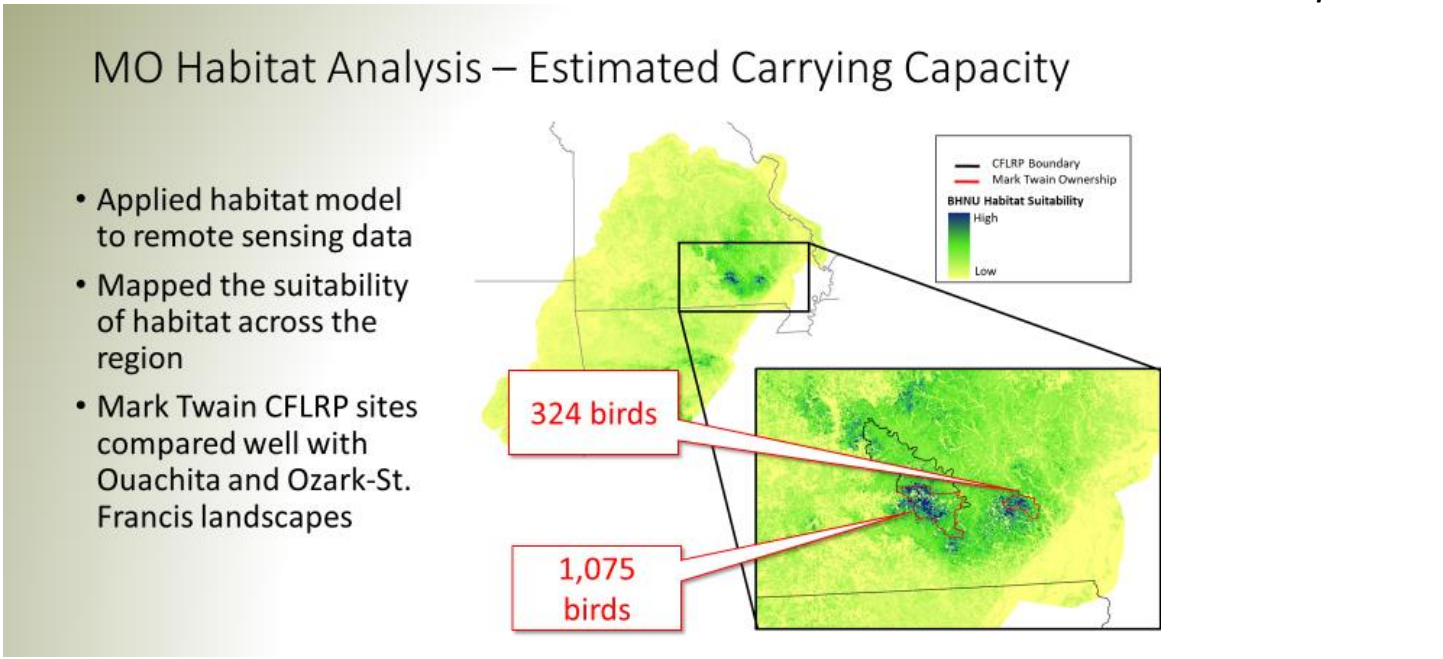



*Figure 1. With the habitat model linked to density of birds we can go back and estimate the carrying capacity of BHNU on the CFLRP sites. Because these estimates are based on the older remote sensing that may not even capture recent management and habitat, suggesting then that these are likely conservative estimates.*

Watershed Monitoring

The Forest has a challenge cost share agreement (#15-CS-11090500-036) with Missouri State University and the Ozark Environmental and Water Resource Institute to conduct studies of forest management in the CFLRP area. The purpose of these studies is to monitor hydrological conditions of typical small streams within the Big Barren Creek watershed under different management conditions. The overall goal is to compare runoff yields and hydrograph shape among the different watersheds. The specific objectives of this project are to: 1) install 10 level logger gaging stations at 2nd and 3rd order streams where upstream watershed areas have different burn histories and monitor stage throughout the length of the project; 2) develop discharge rating curves to calculate annual runoff volume and for flow frequency analysis for each watershed; and 3) compare runoff characteristics of burned versus unburned watersheds. Year 1 work on this goal included site selection and installation of stage gages, development of stage-discharge rating curves using measured and modeled discharges, and preliminary runoff analysis. Project years 2 to 5 included continued discharge data collection, evaluation of site locations and potential adjustments to gaging network sites, more rigorous analysis of runoff records as affected by sub-watershed topography and soils, land use, forest management practices, and seasonal timing of events. Here is a link to papers and poster presentation completed in 2017 discussing results to ongoing studies CFLRP area.

Smoke Monitoring

As a result of public concerns over prescribed fire activities and the effects this may have on air quality, the Forest has initiated additional smoke monitoring efforts that started in the spring of 2016. The Region has purchased for the Forest two E-Samplers that are utilized at receptor sites at selected prescribed burns based on smoke modeling by the Regional Air Quality Specialist. In addition, a fixed visual smoke monitoring camera was placed on the Fremont fire tower within the project area.

**Smoke Monitoring Report 2019:** During the 2019 burn season, burn intensities ranged between low and moderate with pockets of active fire where slope and wind aligned. Most prescribed burns had areas with interspersed pockets of private fields and timber. During the 2019 Rx burn season, 18,765 acres were burned across Zone 2.

Particulate data was collected from several locations most likely to be impacted by particulate concentrations near or slightly above the 35 µg/m³ needed to create hazardous conditions for sensitive members of the public. Typically, fire lookouts were utilized to gather information about elevated wind speeds, column drift and elevations, and to assess the accuracy HYSPLIT forecasts.

Sampling methods used were visual and photographic documentation from observation sites as well as public health and safety impact locations. The sampling sites were determined have the highest probability of exceeding 35 µg/m³ over a populated area.

One E-Sampler measured particulate matter concentration (PMC) and spot weather observations. The E-Sampler measured particulate matter measuring less than 2.5 micrometers in diameter and recorded data in mg/m³ (milligrams per cubic meter). Time was measured in hourly increments using the 0-24 hr. format. As a result of chronic GOES inefficiencies, the data downloaded to the Western Regional Climate Center (WRCC) website was plagued with missing information. Due to this issue, data was collected from the monitor manually and a 24hr period, starting with ignition, was graphed for each prescribed burn. Greenwich Mean Time was not utilized this year to simplify the correlation of results.

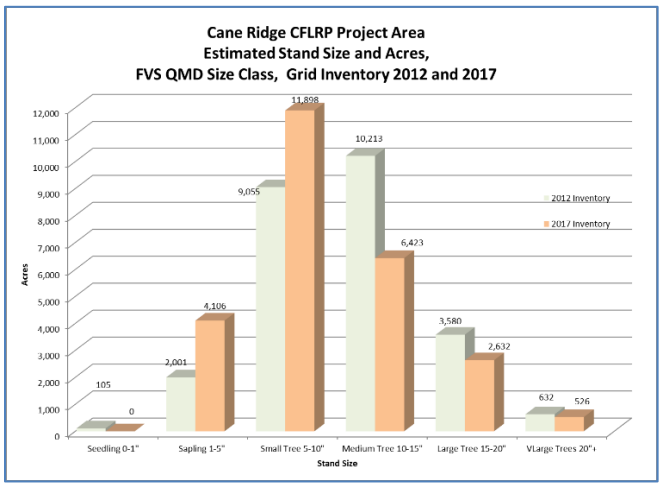
During the FY 19 burn season, the impacts to the public were minimal. No lengthened periods of elevated particulate concentrations were detected. The HYSPLIT and spot forecasts held mostly true with deviations of wind directional changes and cloud cover percentage estimates being the primary miscalculations. The data download inconsistencies were thought to have been remedied early on but continued throughout the burn season. Line of site for the transmitter may have been the issue. Hopefully this will not be an issue during the next burn cycle.

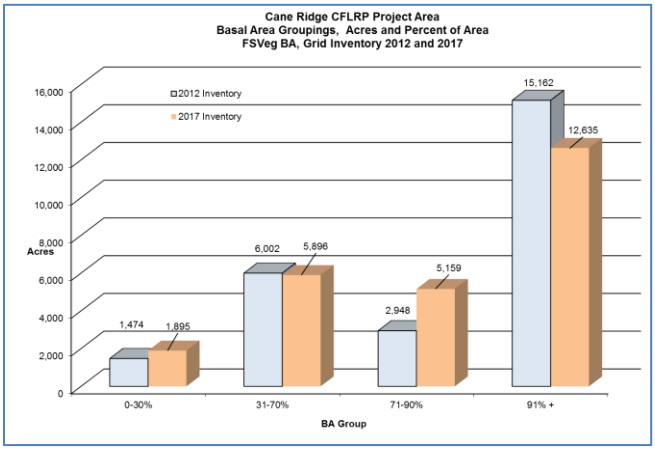
The highest recorded hourly average this season was 37 µg/m³. This low hourly average is likely due increased reliability of spot weather forecasting, HYSPLIT accuracy overall and the ability of the fuels specialist to align planning with appropriate burn windows. Hopefully a trend downward will continue while still meeting objectives on the ground.

*Figure 2: 3/17/19, 1315 CST  Wolf Mountain 1, 2, 5 actively burning just after aerial ignition has begun.  Winds at Briar Lookout were gusting near 25mph.*

Grid Inventory and LANDIS Modeling

Re-measures of the grid plot inventory on 1,320 plots within the CFLRP project area has begun with contracting of all plots in the Cane Ridge unit in 2017. These fixed plots are used to measure structural changes such as changes in canopy closure and basal area. This data will be used in FSveg and LANDIS modeling to measure how well restoration objectives are being meet. Some preliminary results for portions of the CFLRP project area displayed below.




We worked with collaborators from NRS and University of Missouri to apply the LANDIS PRO forest landscape model to analyze expected outcomes for a century of management under alternative scenarios with and without harvesting and burning (Jin et al. 2017). We predicted that pine-dominated woodlands could be restored and sustained on this landscape with periodic timber harvesting (including removal of low-valued small-diameter trees) and frequent burning. Recreating a woodland overstory of 40 to 80% canopy cover required scenarios with timber harvesting on a roughly 20-year reentry cycle to reduce tree cover and increases in the fire frequency (every four years) increased the proportion of pines at the end of the century. All scenarios without timber harvesting resulted in a landscape dominated by closed-canopy oak forest. With neither burning nor harvesting the proportion of white oaks increased. Repeated burning without harvesting increased the proportion of pines in the overstory, but the closed-canopy overstory will remain dominated by an oak overstory.

**6. FY 2019 Agency performance measure accomplishments:**

| Performance Measure | Unit of measure | Total Units Accomplished | Total Treatment Cost ($) *(Contract Costs)* |
|---|---|---|---|
| Acres of forest vegetation established FOR-VEG-EST | Acres | 1,053 | Planting : 415 AC @ $65.00 / AC = $26,975.00; 176AC @ $60.00 /AC = $10,560.00<br><br>SitePrep/ Midstory: $175,000; SitePrep Midstory: $18,000 |
| Acres of forest vegetation improved FOR-VEG-IMP | Acres | 1,480 | |
| Manage noxious weeds and invasive plants INVPLT-NXWD-FED-AC | Acre | 623.1 | Cane Ridge: 164 AC @ $125/AC= $20,500 |

| Performance Measure | Unit of measure | Total Units Accomplished | Total Treatment Cost ($) *(Contract Costs)* |
|---|---|---|---|
| | | | Pineknot: 533AC @ $51.98/AC= $27,711 |
| Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions. S&W-RSRC-IMP | Acres | 27.8 | Integrated |
| Acres of terrestrial habitat restored or enhanced HBT-ENH-TERR | Acres | 1,4240 | Integrated |
| Miles of high clearance system roads receiving maintenance RD-HC-MAIN | Miles | 88.77 | EP: 63.0mi@ $612/mi= $38,556, 33.8mi@ $765/mi= $25,857 PB: 27.8mi@ $663/mi= $18,431, 10.6 mi@$816/mi= $8,649.60 |
| Miles of passenger car system roads receiving maintenance RD-PC-MAINT | Miles | 55.02 | EP: 0.4mi@ $765/mi= $306 PB: 2.2mi@ $816/mi= $1795, PB: 53.4mi @ $116/mi= $6194.40 |
| Acres of forestlands treated using timber sales TMBR-SALES-TRT-AC | Acres | 2,225 | Marking Paint $23,000 Marking: 722AC @$33.33/AC= $24,065 Gooseneck Trailer: $10,000 |
| Volume of timber sold TMBR-VOL-SLD | CCF | 32,472.8 | |
| Green tons from small diameter and low value trees removed from NFS lands and made available for bio-energy production BIO-NRG | Green tons | 9739.131 | |
| Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildland fire FP-FUELS-NON-WUI | Acre | 11,137 | Force Account-$15/AC |
| Acres of wildland/urban interface (WUI) high priority hazardous fuels treated to reduce the risk of catastrophic wildland fire FP-FUELS-WUI | Acres | 3,676 | Force Account-$15/AC |

Units accomplished should match the accomplishments recorded in the Databases of Record.

7. **FY 2019 accomplishment narrative** – Summarize key accomplishments and evaluate project progress *not already described elsewhere* in this report. ***For projects finishing their tenth year***, if you have any additional insights from your cumulative work over the course of the project please share those here as well. (Please limit answer to three pages.)

8. **The WO (EDW) will use spatial data provided in the databases of record to estimate a treatment footprint for your review and verification**. This information will be posted here on the internal SharePoint site for verification *after the databases of record close October 31*.

- **If the estimate is consistent and accurate**, please confirm that below and skip this question.
- **If the gPAS spatial information does NOT appear accurate**, describe the total acres treated in the course of the CFLR project below (cumulative footprint acres; not a cumulative total of performance accomplishments). What was the total number of acres treated?

| Fiscal Year | Footprint of Acres Treated (without counting an acre of treatment on the land in more than one treatment category) |
|---|---|
| FY 2019 | 21,109.68 |
| Estimated Cumulative Footprint of Acres (2012 through 2019) | 93,199.95 |

**If you did not use the EDW estimate, please briefly describe how you arrived at the total number of footprint acres: what approach did you use to calculate the footprint?**

The EDW estimate was used.

9. **Describe any reasons that the FY 2019 annual report does not reflect your project proposal, previously reported planned accomplishments, or work plan.** Did you face any unexpected challenges this year that caused you to change what was outlined in your proposal? ***For projects finishing their tenth year***, if you have any additional insights from your cumulative work over the course of the project please share those here as well. (Please limit answer to two pages).

**10. *Project selected in 2012 and 2013 ONLY* -** Planned FY 2020 Accomplishments

| Performance Measure Code | Unit of measure | Planned Accomplishment for 2020 (National Forest System) | *Planned Accomplishment on non-NFS lands within the CFLRP landscape*[3] |
|---|---|---|---|
| Acres of forest vegetation established FOR-VEG-EST | Acres | 1000 | |
| Manage noxious weeds and invasive plants INVPLT-NXWD-FED-AC | Acre | 700 | |
| Acres of terrestrial habitat restored or enhanced HBT-ENH-TERR | Acres | 16,000 | |
| Miles of passenger car system roads improved RD-PC-IMP | Miles | 50 | |

[3] As we shift to more emphasis on sharing results across all lands within the CFLRP projects – if relevant for your project area – please provide estimates for planned work on non-NFS lands within the CFLRP areas for work that generally corresponds with the Agency performance measure to the left and supports the CFLRP landscape strategy. Give your best estimate at this point; if it's unknown how much work will occur off NFS lands, simply state unknown.

| **Performance Measure Code** | **Unit of measure** | **Planned Accomplishment for 2020** (National Forest System) | ***Planned Accomplishment on non-NFS lands within the CFLRP landscape[3]*** |
|---|---|---|---|
| Miles of high clearance system road improved RD-HC-IMP | Miles | 75 | |
| Volume of timber sold TMBR-VOL-SLD | CCF | 30,000 | |
| Green tons from small diameter and low value trees removed from NFS lands and made available for bio-energy production BIO-NRG | Green tons | 10,000 | |
| Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildland fire FP-FUELS-NON-WUI | Acre | 8,000 | See Fig. 3 Prescribed Burn units, all agencies. |
| Acres of wildland/urban interface (WUI) high priority hazardous fuels treated to reduce the risk of catastrophic wildland fire FP-FUELS-WUI | Acres | 8,000 | See Fig. 3 Prescribed Burn units, all agencies. |

Please include all relevant planned accomplishments, assuming that funding specified in the CFLRP project proposal for FY 2020 is available.

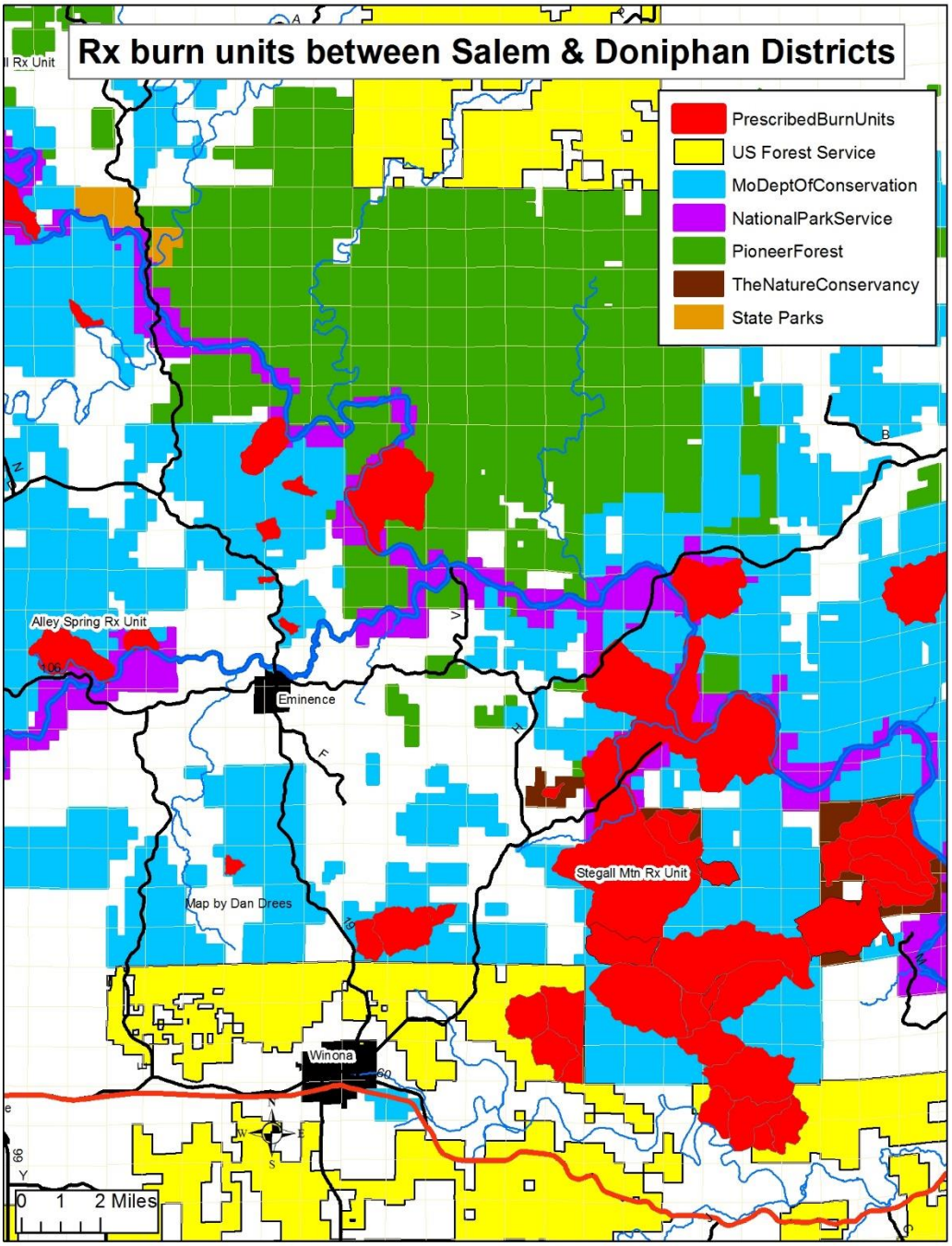



Figure 3. Prescribed Burn units, all agencies. Located between the Salem and Doniphan Ranger Districts, Mark Twain National Forest, Missouri.

11. ***Project selected in 2012 and 2013 ONLY* -** Planned accomplishment narrative and justification if planned FY 2020 accomplishments and/or funding differs from CFLRP project work plan (no more than 1 page): Planned FY2020 does not differ from CFRLP project work plan.

12. **Please include an up to date list of the members of your collaborative <u>if</u> it has changed from previous years**. If the information is available online, you can simply include the hyperlink here. If you have engaged new collaborative members this year, please provide a brief description of their engagement.

No change.

13. **Media recap**. Please share with us any hyperlinks to videos, newspaper articles, press releases, scholarly works, and photos of your project in the media that you have available. You are welcome to include links or to copy/paste.

https://wildlife.org/restoration-of-pine-oak-woodlands-in-missouri-from-the-wildlife-professional/

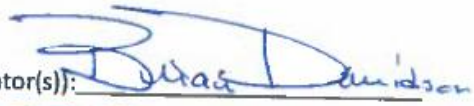
https://landscapecollaboration.org/case-studies/encouraging-fire-resistant-species-missouris-ozark-highlands

https://mospace.umsystem.edu/xmlui/bitstream/handle/10355/59987/research.pdf?sequence=2&isAllowed=y

https://www.sciencedaily.com/releases/2019/06/190625173438.htm

http://gis.missouri.edu/pdfs/Jin%20et%20al._2018_Forest%20Ecology%20and%20Management.pdf

**Signatures:**

Recommended by (Project Coordinator(s)): 

Approved by (Forest Supervisor(s)): 

Draft reviewed by (collaborative chair or representative): _____