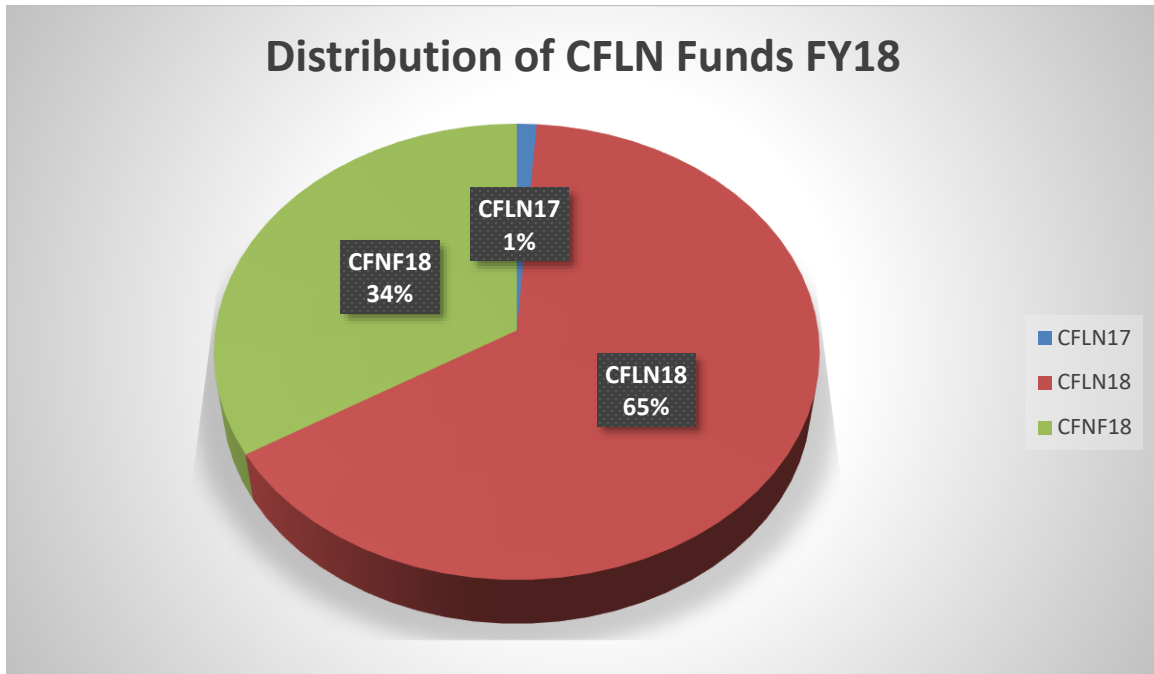


**CFLR Project (Name/Number): Colorado Front Range/CFLR004**  
**National Forest(s): Arapaho & Roosevelt and Pike & San Isabel National Forests**

**1. Match and Leveraged Funds:**

**a. FY18 Matching Funds Documentation**



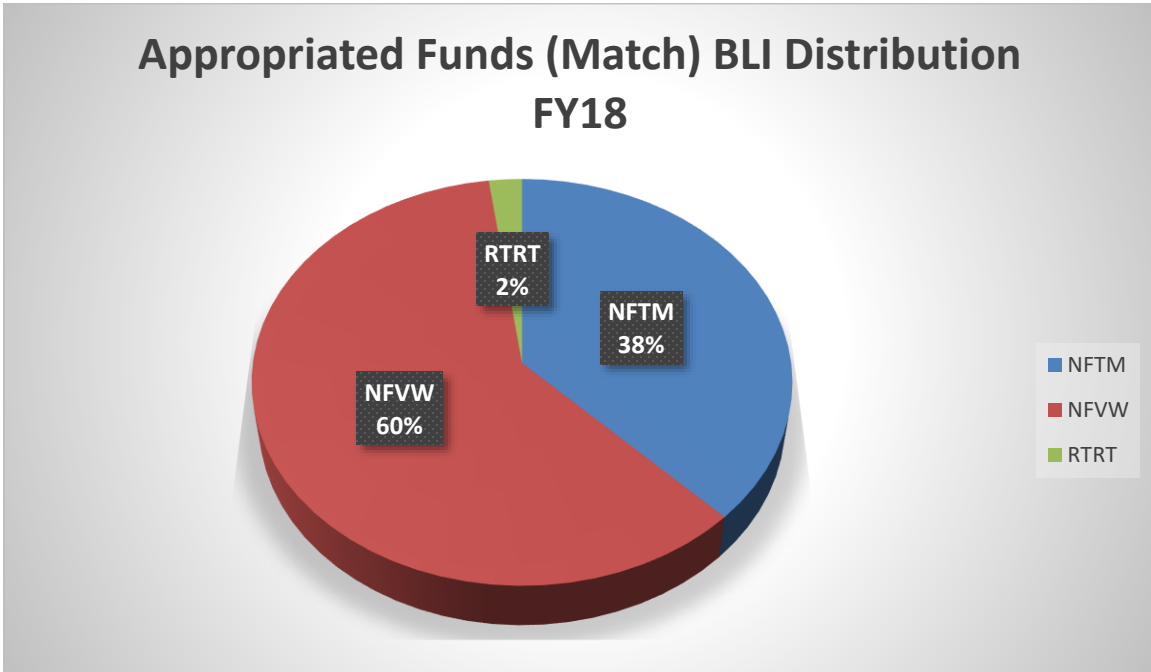
<b>Fund Source – (CFLN/CFLR Funds Expended)</b>	<b>Total Funds Expended in Fiscal Year 2018</b>
CFLN	\$2,473,676*

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.

\*FMMI total CFLN spent is \$2,517,676

<b>Fund Source – (Funds expended from Washington Office funds (in addition to CFLR/CFLN) (please include a new row for each BLI))</b>	<b>Total Funds Expended in Fiscal Year 2018</b>
CFNF	\$1,280,064

This value (aka carryover funds or WO unobligated 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 2018
NFTM	\$201,457
NFWW	\$322,370
RTRT	\$11,616

This amount should match the amount of matching funds obligated 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 2018
CWFS (Colorado Springs Utilities)	\$465,899
NFXN (Denver Water, Arbor Day)	\$1,039,618

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, and Watershed work can be found in WIT database.

Fund Source – (Partner In-Kind Contributions)	Total Funds Expended in Fiscal Year 2018
Colorado Forest Restoration Institute	\$65,000
Coalitions and Collaboratives	\$15,000
Bird Conservation of the Rockies	\$5,000

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.

<b>Service work accomplishment through goods-for services funding within a stewardship contract (for contracts awarded in FY18)</b>	<b>Totals</b>
PSICC, Carrol Lakes	\$7,443.00
PSICC, Raleigh Peak	\$4,305.71

Revised non-monetary credit limits for contracts awarded prior to FY18 were captured in [previous reports](#) (FY16 and FY15). This 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.

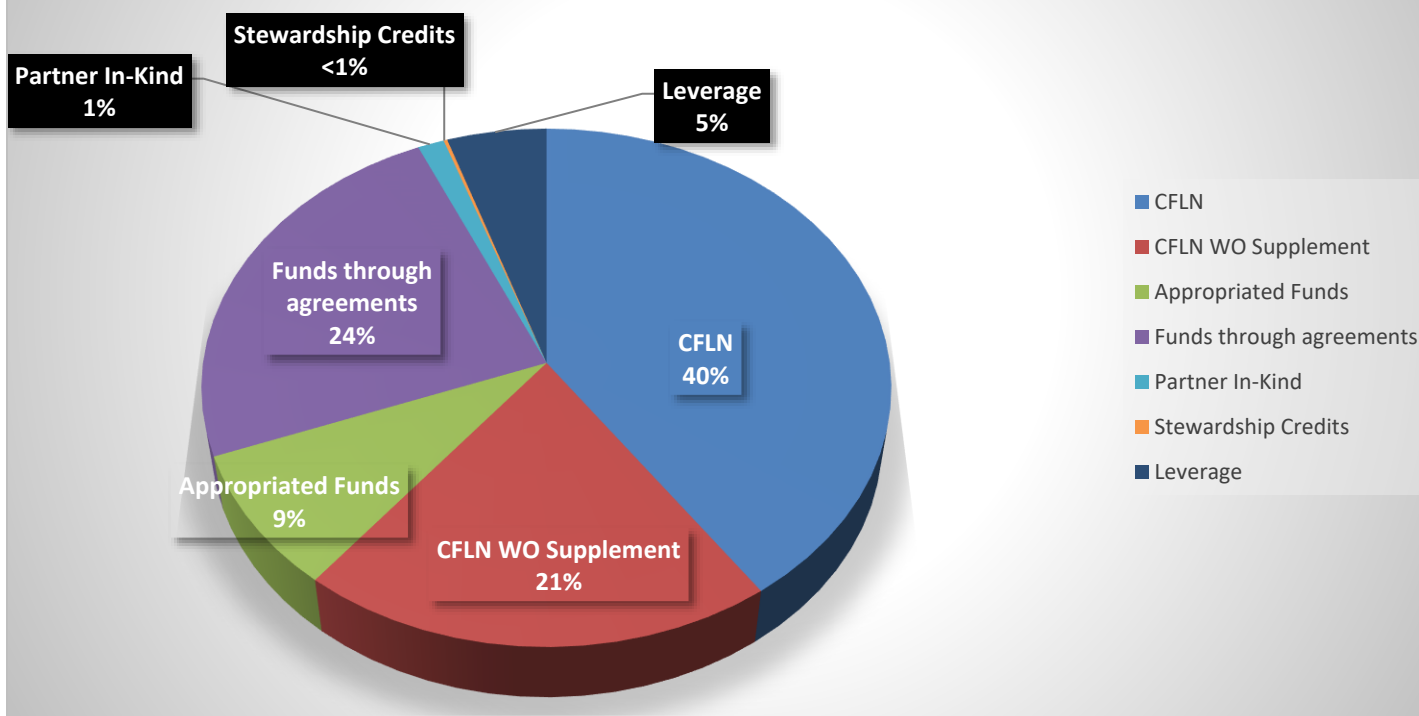
**b. Please fill in the table describing leveraged funds in your landscape in FY2018.** Leveraged funds refer to funds or in-kind services that help the project achieve proposed objectives but do not meet match qualifications.

<b>Description of item</b>	<b>Where activity/item is located or impacted area</b>	<b>Estimated total amount</b>	<b>Forest Service or Partner Funds?</b>	<b>Source of funds</b>
Restoration / Hazardous Fuels Reduction	Jefferson County (150 acres)	\$176,831	Partner Funds	TNC Private
Restoration / Hazardous Fuels Reduction	Jefferson County (71 acres)	\$43,200	Partner Funds	TNC Private
Restoration/Hazardous Fuels Reduction – Collaborative Prescribed Burn Planning	Larimer County and Boulder County (129,000 acres)	\$70,000	Partner Funds	TNC Ben Delatour Ranch CPRW  NRCS
Restoration/Hazardous Fuels Reduction – Collaborative Prescribed Burn	Larimer County (2,800 acres)	\$30,000	Partner Funds	TNC Larimer County DFPC

**Distribution of All Funds Colorado Front Range Initiative**

<b>Fund Source</b>	<b>Amount</b>	<b>% of Funds</b>
CFLN	\$2,517,676	40%
CFLN WO Supplement	\$1,280,064	21%
Appropriated Funds	\$535,443	9%
Funds through agreements	\$1,505,517	24%
Partner In-Kind	\$85,000	1%
Stewardship Credit	\$11,748	<1%
Leveraged	\$320,031	5%
<b>TOTAL</b>	<b>6,255,479</b>	

## Distribution of All Colorado Front Range Funds FY18



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*.

### FY2018 Overview

<u>FY18 Activity Description (Agency performance measures)</u>	<u>Acres</u>
Number of acres treated by prescribed fire	2,622
Number of acres treated by mechanical thinning	2,490
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	5,112
Number of acres mitigated to reduce fire risk	5,112

The Colorado Front Range Project aims to restore lower montane forest structure and function by reducing forest densities, creating diverse patterns of forest structure at stand and landscape-scales, and reducing the potential for uncharacteristically severe wildfire. Approximately 31,600 acres were identified for treatment under the CFLR project from the Pike-San Isabel National Forest (PSICC) in the southern Front Range to the Arapaho-Roosevelt National Forest (ARP) in the northern Front Range. The Colorado Front Range Initiative has implemented large-scale implementation of mechanical treatments, over the last 9 years of the CFLRP program. The table below displays the acres of mechanical contract awards and the acres completed over the 9 years of CFLRP. The mechanical activities combined with

prescribed fire is moving parts of the landscape towards desired conditions and goals outlined in the 10-year strategy, as shown in the table below.

<b>Fiscal Year</b>	<b>Mechanical Contract (acres)</b>	<b>Prescribed Fire (acres)</b>
FY10	981	0
FY11	4,147	0
FY12	2,799	0
FY13	2,978	0
FY14	2,808	0
FY15	784	0
FY16	3,401	301
FY17	2,116	2038
FY18	2,490	2,622
<b>TOTAL</b>	<b>22,504</b>	<b>4,961</b>

Treatments accomplished in 2018 were generally consistent with the pace of previous years. In 2017 and 2018 there was a push to complete more prescribed fire just to keep up with the pace of previous year's accomplishments. This is due to rising mechanical costs and competitive budgets.

In general, monitoring and analysis has indicated that project treatments have created forest structure that more closely resembles historical forest structure. However, post-treatment monitoring has shown differences between post treatment forest structure and historical stand structures do exist. Post treatment stands were characterized by a higher abundance of Douglas-fir, a reduction of structural variability, fewer large openings, and small and medium groups of retained trees appeared to be under represented. Despite these conclusions, the landscape restoration and monitoring team felt that progress was being made in moving stand conditions closer to restored conditions.

The following picture are examples of the types of treatments that are occurring in the CFLRP area. These are mechanical contracts designed to restore the landscape towards a more resilient and fire adapted ecosystem.

**Pike and San Isabel NF  
Round Mountain Stewardship Before Treatment**





### Round Mountain Stewardship After Treatment



As stated there was an increase in prescribed fire treated areas within the CFLRP area in 2018 with over 2,600 acres completed or about 50% of the total CFLRP treatment acres. This was the first year in the Colorado Front Range that more than 10% of acres were treated using prescribed fire.

Areas prioritized for treatment included new NEPA decisions such as Upper Monument Creek of the Pike and San Isabel NF. This was a collaboratively planned vegetation management project and is a high priority for the USFS and the collaborative team. In 2018, it was the first year that treatments were completed under this decision, collaborative engagement included reviewing silviculture marking guides and providing input. The input did result in changes to some silviculture prescriptions, although we continue to work on improving the process for all on the collaborative.

### Red Feather North Prescribed Fire Treatment Arapaho and Roosevelt National Forests



Areas prioritized for treatment on the Arapaho and Roosevelt National Forests include the Red Feather North area where approximately 1,700 acres were broadcast burned to meet restoration objectives. The planning and implementation of this project was accomplished through collaboration with a team of partners that include multiple volunteer fire departments, Larimer County, The Nature Conservancy and Colorado Division of Fire Prevention and Control. The project is located in the transition between lower and upper montane zones near the town of Red Feather Lakes, which has approximately 800 residences. All of the treatments in the Red Feather North area are in high wildfire hazard areas.

Approximately 3,000 acres of mechanical and manual fuels reduction treatments were completed outside of the burn perimeter in previous years to prepare for broadcast burn implementation. These treatments were strategically located to allow fire managers the necessary flexibility to manage planned ignitions and maximize the treated footprint. In the last two years, approximately 4,200 acres of broadcast burning have been completed in the project area. Red Feather North is a good example of how we are learning to prioritize the location of our mechanical treatments to increase the scale of restoration treatments at a lower cost per unit.

#### Fire Preparedness and Suppression Expenditures

Category	\$
FY2018 Wildfire Preparedness <sup>1</sup>	\$3,011,673 (PSICC) \$802,760 (ARP)
FY2018 Wildfire Suppression <sup>2</sup>	1,000,000 (PSICC) \$650,000 (ARP)
The cost of managing fires for resource benefit if appropriate (i.e. full suppression versus managing)	NA
FY2018 Hazardous Fuels Treatment Costs (CFLN)	\$2,473,676
FY2018 Hazardous Fuels Treatment Costs (other BLIs)	\$2,040,960

#### Fire Suppression Activities

FOREST	FIRE NAME	ACRES	MANAGEMENT STRATEGY
Pike and San Isabel	Weston Pass	13,023	contain
Arapaho and Roosevelt NF	Seaman	2,800	full suppression
<b>Total</b>	<b>ACRES</b>	<b>15,823</b>	<b>Containment and Full Suppression</b>

**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. ?

<sup>1</sup> 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).

<sup>2</sup> 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.

No analysis has been completed.

**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 reports have been completed.

There were no occurrences in 2018 of wildfires burning through treated or planned treatment areas within the Colorado Front Range CFLRP boundary.

### 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](#).

- Many of the projects produce little or no forest products due to wood deterioration from mountain pine beetle mortality.
- The Front Range of Colorado has very little forest products infrastructure.
- There are limited markets for forest products on the Front Range.
- The cost of transporting forest biomass is a limiting factor.

### FY 2018 Jobs Supported/Maintained (FY18 CFLR/CFLN/ WO carryover funding):

FY 2018 Jobs Supported/Maintained	Jobs (Full and Part-Time) (Direct)	Jobs (Full and Part-Time) (Total)	Labor Income (Direct)	Labor Income (Total)
Timber harvesting component	11	15	\$508,673	\$856,831
Forest and watershed restoration component	26	32	\$316,874	\$558,567
Mill processing component	6	18	\$201,880	\$527,247
Implementation and monitoring	31	36	\$698,822	\$902,414
Other Project Activities	2	4	\$120,929	\$176,256
<b>TOTALS:</b>	<b>77</b>	<b>104</b>	<b>\$1,847,177</b>	<b>\$3,021,315</b>

### FY 2018 Jobs Supported/Maintained (FY18 CFLR/CFLN/ WO carryover and matching funding):

FY 2018 Jobs Supported/Maintained	Jobs (Full and Part-Time) (Direct)	Jobs (Full and Part-Time) (Total)	Labor Income (Direct)	Labor Income (Total)
Timber harvesting component	11	15	\$508,673	\$856,831
Forest and watershed restoration component	36	44	\$435,165	\$767,082
Mill processing component	6	18	\$201,880	\$527,247
Implementation and monitoring	43	51	\$1,096,794	\$1,416,330
Other Project Activities	3	5	\$161,636	\$234,200
<b>TOTALS:</b>	<b>100</b>	<b>132</b>	<b>\$2,404,147</b>	<b>\$3,801,690</b>



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 Colorado Front Range Initiative achieved a number of community benefits over the last year. The table below

5. Based on your project monitoring plan, **describe the multiparty monitoring process.**

Indicator	Brief Description of Impacts, Successes, and Challenges	Links to reports or other published materials (if available)
Project partnership composition	Partnerships associated with the FR-CFLRP have been instrumental in accomplishing additional acres of treatment by giving us the opportunity to leverage appropriated funds to increase effectiveness across larger scales.	
Relationship building/collaborative work	The Landscape Restoration Team and Monitoring Group has been instrumental in influencing the design and implementation of restoration treatments and the success of the FR-CFLR Project.	The General Technical Report, <a href="#">Principles and Practices for the Restoration of Ponderosa Pine and Dry Mixed-Conifer Forests of the Colorado Front Range</a> (RMRS-GTR-373) was published in 2018.
Community support for relevant initiatives	Projects have given us the opportunity to build community support for projects and treatments. The public has gained a new understanding of projects and processes. Prior to the Front Range CFLRP, an assessment of collaborative progress and performance was conducted for two projects in 2009, the Woodland Park Healthy Forest Initiative	<a href="#">Woodland Park Healthy Forest Initiative- Collaboration Case Study</a>
Economic dependency/sectors impacted/expanding market development		FRRT CFLRP 2018 Ecological, Social and Economic Monitoring Plan <a href="#">FRRT CFLRP 2018 Ecological, Social, and Economic Monitoring Plan</a>

## MULTI-PARTY MONITORING PROCESS

At the beginning of the Colorado Front Range CFLRP in 2010, a subgroup of the Front Range Roundtable (FRRT), the Landscape Restoration Team (LRT) was tasked with the creation of a CFLR project monitoring plan. The initial monitoring plan was successfully completed in June 2011 and has been updated almost annually with the latest in the [FRRT CFLRP 2018 Ecological, Social, and Economic Monitoring Plan](#). The CFLR project monitoring plan has been the continued result of multiple stakeholder learning and deliberations by the LR Team and Front Range Roundtable. The multiple stakeholder group consisted of members of both the Pike-San Isabel and Arapaho-Roosevelt National Forests, USFS R2-Regional Office, Colorado State Forest Service, US Geological Survey, Colorado Parks and Wildlife, Natural Resource Conservation Service, The Nature Conservancy, The Wilderness Society, Rocky Mountain Research Station, Colorado Forest Restoration Institute (CFRI) at Colorado State University, and the Tree Ring Laboratory at Colorado State University.

[UPDATE-Forest Structure, Composition and Spatial](#)

- Study conducted entitled “Adaptive Management in the Front Range CFLRP: Assessing Changes in Stand-Scale Forest Structure and Composition.”
  - Study evaluated the effectiveness of seven early CFRLP treatments that were conducted on the Arapaho Roosevelt (ARP) and Pike and San Isabel National Forests (PSICC).
  - The primary question of the study was: Have there been positive outcomes of the changes in desired forest density and composition? (Dickenson et al 2014)
    - Decreasing tree density and basal area
    - Favoring ponderosa pine over other conifers
    - Enhancing the spatial mosaic of gaps and openings
    - Increasing tree patch size heterogeneity
- Restoration treatments reduced basal area and tree density but did not favor Douglas fir for removal over ponderosa pine on a program scale. There was a 28% reduction in ponderosa density and a 38% reduction in Douglas fir density. Additionally, differences in spatial structure remain between post-treatment and historical forest stands. The researchers recommend increasing the emphasis placed on the removal of Douglas fir on wetter slopes. The results showed very similar reductions in Douglas fir density on both types of slopes.
- Restoration increased the proportion of ponderosa pine among conifer from 60% to 65%, which is statistically significant but not necessarily ecologically meaningful.
- Treatments doubled both the total cover and frequency of significant gaps in the forest. Treatments also reduced the number of large gaps and increased the diversity of gap sizes. Differences remain between post-treatment and historical spatial structures. The researchers recommend creating more gaps and emphasizing gap size diversity.
- The next step for the researchers is to complete a study to evaluate the adaptive management process, developed within the collaborative, and its corresponding effects on treatment outcomes. The appearance is that adaptive management is influencing treatment progression. Specifically, adaptive management seems to have recently favored ponderosa pine and the removal of Douglas fir on wet slopes. The researchers will convey the new study feedback to the USFS.

#### UPDATE-Understory Botany Monitoring

The Front Range Collaborative Forest Landscape Restoration Program (FR-CFLRP) is utilizing two complimentary understory plant monitoring efforts to evaluate whether FR-CFLRP treatments are having the following desired outcomes:

- Increasing (or at least maintaining) the abundance and diversity of native plants;
- Increasing (or at least maintaining) the abundance and diversity of native graminoids, forbs, and shrubs;
- Increasing the abundance and diversity of native early successional species; and
- Maintaining (or at least only minimally increasing) the abundance and diversity of exotic plants.

The first effort was initiated in 2011, with support initially coming from The Southern Rockies Landscape Conservation Cooperative (SRLCC), Boulder County, the United States Geological Survey (USGS), the Rocky Mountain Research Station (RMRS), and the Natural Resources Conservation Service (NRCS). In the first year of the effort, 66 monitoring plots were established within and surrounding five planned FR-CFLRP treatment units and two planned Boulder County treatment units, and pre-treatment data were collected. Treatments occurred in 2011-2012, and 1 year post-treatment data were subsequently collected in 2012-2013 and published in the journal *Forest Ecology and Management* (Briggs, et al, 2017). In 2017, the FR-CFLRP, RMRS, and the Colorado Forest Restoration Institute (CFRI) provided support to expand the

temporal scope of this effort by collecting 5-6 year post-treatment data. Preliminary data analyses were conducted in 2018, and suggest that treatments have resulted in progress toward several desired outcomes, including increasing native understory plant abundance; increasing the abundance of native graminoids and forbs; and minimizing increases in exotic plant abundance and diversity.

The second effort was initiated in 2015, with support provided by the FR- CFLRP, RMRS, and CFRI. In 2015, 189 monitoring plots were established within and surrounding 16 planned CFLRP treatment units, and pre-treatment data were collected. Treatments occurred in 2015-2016 in four units; the plots within and surrounding these units were measured in 2017, 1-2 years post-treatment. Six additional units were treated in 2017; the plots within and surrounding them were measured in 2018, 1 year post-treatment. Six additional units were treated in 2018, it is uncertain when those plots will be re-measured. Additionally, in 2017 CFRI leveraged monitoring funding from Denver Water to install 42 pre-treatment plots within and surrounding 3 CFLRP treatment units. The units were treated in the winter of 2018, and re-measured 1 year post in 2018. Additional analysis is forthcoming to examine trends across the geography, restoration treatment types, and time series of treatments

#### UPDATE-Wildlife Monitoring

- Bird Conservancy of the Rockies is working on analysis of the first 2 monitoring cycles, and is completing data management from this summer's efforts. This analysis is focused on treatment effects and habitat relationships.
- The Wildlife Team will present initial results at the 2019 annual meeting of the Colorado Chapter of the Wildlife Society, and possibly prepare and submit a manuscript for publication.
- The Wildlife Team is also exploring ways to translate the results into user-friendly tools for project planning and analysis, etc. Completing the analysis is a key step toward developing such value-added tools.
- On initial finding is "In essence, species may apparently shuffle around in relation to treatment at the point level, but we are not losing any and in fact are gaining a number of species at the 1-km (landscape) scale." Of course, these results are preliminary and subject to change / refinement

#### UPDATE-Watershed Health Monitoring

- Ongoing Monitoring
  - The Forest Service and LRT initiated an effort to develop a watershed health monitoring protocol at the end of fiscal year 2016. The initial watershed health monitoring subgroup includes representatives from the City of Aurora, the Colorado Forest Restoration Institute, and the Nature Conservancy.
  - The monitoring protocol has been slow to develop. The expertise and time commitment needed to run complicated fire behavior and hydrological models has been a major obstacle in developing useful watershed health metrics.
  - The importance of monitoring impacts of forest management on water quality is still a priority, and the LRT is continuing to work on this.

#### UPDATE-Fire Effects Monitoring

- Fire Effects
  - Leaders from the AR and PSI National Forests have expressed an interest to use more prescribed fire and would like to standardize monitoring protocols.

- The LRT has initiated the formation of a sub-team to develop desired conditions and protocols for monitoring fire effects.
- The USFS has good metrics and sound methods but is not measuring plots at a high enough intensity. The recommendation is to develop CSE protocols not just on mechanical treatments but on prescribed fires as well. This would allow for standardized protocols.
- The anticipation is that in the later years of CFLRP there will be more broadcast burning, and a fire monitoring team will support the USFS in their efforts to return fire to the Front Range landscape.

#### UPDATE-Social and Economic

- Social and Economic
  - Monitoring in 2013 focused on Funding and Accomplishments, Economic Contributions, and Wood Utilization. Levels of Collaboration was last monitored in 2011-2012.
  - A total of \$3.3 million were funded for CFLRP projects in 2013 with a total of 2,978 acres treated. Additionally, about \$3.9 million in matching funds for 2013, coming from USFS matching funds.
  - The CFLRP also leveraged roughly \$35.8 million in funds in non-Forest Service System lands projects areas associated with the CFLRP project area from the Colorado State Forest Service, The Coalition for the Upper South Platte, Denver Water, Colorado Springs Utilities, NRCS, and The Waldo Recovery Group.
  - Six contracts were associated with the Front Range CFLRP in 2013. 2012 CFLR projects resulted in nearly 15 full or part time jobs, \$276,760 in labor income, and \$524,672 in GDP to the local economy.
  - A total of 1,811 acres were treated under the Front Range CFLRP in 2013 (718 in the PSI and 1,093 on the AR). 66% of the forest products removed on the PSI were done mechanically, whereas 77% of the AR was completed manually. Three businesses purchased harvested material from Front Range CFLRP treatments, all of which were from Colorado. A large portion of the biomass from both forests went to wood chips used for post-fire rehabilitation efforts. All of the biomass material was sold as sawtimber and is assumed to have been processed into dimensional lumber.
  - Public Outreach- In response to a literature review conducted in 2011, considerable effort was given towards identifying public outreach mechanisms in 2012. Four focus group meetings with public outreach experts yielded recommendations for the FRRT to support outreach across the Front Range. These are detailed in the 2017 monitoring plan.

#### **WEAKNESSES**

Our monitoring process is vibrant and provides additional confidence to a highly engaged stakeholder group. However, the greatest shortcoming of this process is that it takes time to collect and properly interpret the data. There is a genuine and reasonable desire to swiftly integrate new information into an adaptive management framework, but the most important questions are frequently those that cannot be quickly answered. So we collect both short-term and longer term-data and combine it with the best available science to inform our decisions and adapt our approaches to management.

#### **6. FY 2018 Agency performance measure accomplishments:**

Performance Measure	Unit of measure	Total Units Accomplished	Total Treatment Cost (\$) <i>(Contract Costs)</i>
Acres of forest vegetation established	Acres	2,228	\$300/ac

Performance Measure	Unit of measure	Total Units Accomplished	Total Treatment Cost (\$) (Contract Costs)
FOR-VEG-EST			
Acres of forest vegetation improved FOR-VEG-IMP	Acres	5,261	See fuels WUI
Manage noxious weeds and invasive plants INVPLT-NXWD-FED-AC	Acre	2,533	\$375/ac
Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions. S&W-RSRC-IMP	Acres	2,266	
Acres of terrestrial habitat restored or enhanced HBT-ENH-TERR	Acres	3,224	
Acres of forestlands treated using timber sales TMBR-SALES-TRT-AC	Acres	299	
Volume of timber sold TMBR-VOL-SLD	CCF	5,216	\$60/CCF
Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildland fire FP-FUELS-NON-WUI	Acre	48	See fuels WUI
Acres of wildland/urban interface (WUI) high priority hazardous fuels treated to reduce the risk of catastrophic wildland fire FP-FUELS-WUI	Acres	6,697	\$1,200/ac
Please also include the acres of prescribed fire accomplished	Acres	2,622	\$500/ac

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

**7. FY 2018 accomplishment narrative** – Summarize key accomplishments and evaluate project progress *not already described elsewhere* in this report. (Please limit answer to three pages.)

#### ARAPAHO AND ROOSEVELT NATIONAL FORESTS

In 2018, the Arapaho and Roosevelt National Forests accomplished 2,572 acres of restoration and WUI fuels treatments in the CFLRP area. Restoration objectives were met through the implementation of prescribed burning on 1,702 acres, while 870 acres of mechanical thinning was accomplished. The ARP recently began shifting its focus to include more use of prescribed fire in achieving hazardous fuels reduction and restoration objectives. During the winter of 2017, the Red Feather North prescribed burn was completed within the CFLR footprint. The project is located in the transition between lower and upper montane zones near the town of Red Feather Lakes, which has approximately 800 residences. Forest cover type in the surrounding landscape is predominantly characterized by ponderosa pine forest with mixed conifer timber stands on the northern aspects. Cover type transitions to lodgepole pine as elevation increases in the project area. Within the treated broadcast burn areas, ladder and surface fuels reduction are emphasized with the following objectives:

- Reduce understory vegetation by 65-80%
- Restore historical forest structure and stand density by allowing up to 30% overstory mortality in mature ponderosa pine stands and up to 50% overstory mortality in mixed conifer stands.
- Enhance wildlife habitat and promote a more fire resilient ecosystem by reducing conifer encroachment into aspen stands and meadows by at least 70%.
- Limit canopy scorch height to less than 30 feet.



Approximately 3,000 acres of mechanical and manual fuels reduction treatments were completed outside of the burn perimeter in previous years to prepare for broadcast burn implementation. These treatments were strategically located to allow fire managers the necessary flexibility to manage planned ignitions and maximize the treated footprint. In the last two years, approximately 4,200 acres of broadcast burning have been completed in the project area.

In addition to broadcast burning implementation, the ARP awarded three service contracts designed to integrate hazardous fuels reduction and restoration objectives on approximately 870 acres in the CFLRP area. These treatments are designed to retain individuals and clumps of older, larger diameter trees in the ponderosa pine and dry mixed conifer type. Target stand structures are distributed among meadows and enhanced openings to facilitate a more open forest environment with improved shrub and grass diversity. A subset of these project acres are also designed as initial entries into very dense stand structures where understory thinning prescriptions reduce stand density. Understory thinning prescriptions set the stage for future broadcast burning operations to further meet hazardous fuels reduction and restoration objectives.

#### PIKE AND SAN ISABEL NATIONAL FORESTS

The PSICC was able to complete 1,980 acres of restoration and WUI fuels treatments in the CFLRP area.

- Mechanical completion of 1,379 acres.
- Prescribed Fire completion of 601 acres.

Timber volume was sold on three stewardship contracts that totaled 4,448 CCF of sawtimber and other products. Reforestation efforts in the Hayman burn area continued with over 900 acres planted with ponderosa pine seedlings, funded in part through an ongoing partnership with the Arbor Day Foundation and other partners. Also, prescribed fire took place in the fall of 2017 completing 601 acres of restoration.

The PSICC awarded three stewardship and one service contract totaling 1,179 acres of restoration/fuels reduction, within the CFLRP area. The objectives of these projects primarily emphasize the retention of older trees in the ponderosa pine and dry mixed conifer types, opening up densely closed stands of mid to late seral classes, creating a more open forest environment and improving shrub and grass diversity, and increasing resilience to disturbances such as wildfire.

Partnerships continue to contribute significantly to matching treatments within the CFLRP area in 2018. With 350 acres of fuels reduction funded by partnerships, contributions are an important component in being able to fund activities within the CFLRP area. The combined contribution of partnership funds in FY17 to fund treatments on NFS lands was a little over \$8 million. Partners provided approximately 50 percent of the total matching funds.

Also, an emphasis on the use of prescribed fire to accomplish restoration and WUI fuels reduction activities continued in FY18. In November of 2017, two prescribed burns within the CFLRP were completed that resulted in 601 acres of restoration/fuels reduction accomplished. Given the challenges of completing a prescribed burn in areas along the Colorado Front Range it was considered a huge success and the PSICC will continue to emphasize use of prescribed fire to do restoration work.

#### UPPER MONUMENT CREEK

FY18 marked the first year that implementation of the Upper Monument Creek EIS/ROD occurred. The 67,000-acre Upper Monument Creek Landscape EIS (signed 8/17) on the Pikes Peak RD was a planning project where management recommendations were collaboratively developed. The landscape is located in a high fire risk area in close proximity to previously analyzed and treated CFLRP project areas, including the Trout West and Catamount Projects. A diverse suite

of agencies, organizations and individuals, collaborated in an effort to accelerate the pace of urgently needed forest restoration recommendations that are science-based and collaboratively agreed to.

The FRRT Landscape Restoration team continues to work collaboratively within the Upper Monument project area, identifying treatment types and locations, defining desired conditions for the vegetation types that occur within the project area, recommending project design criteria, and providing other management recommendations. The ROD and FEIS is posted on the web at [Upper Monument Creek EIS](#).

**8. The WO (EDW) will use spatial data provided in the databases of record to estimate a treatment footprint for your review and verification.**

- **If the estimate is consistent and accurate**, please confirm that below and skip this question.
- - Colorado Front Range CFLRP-EDW Estimate = 4,102 acres
- **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)
Total footprint of acres treated from start year through FY18.	FY10 through FY18 - 27,472 acres <sup>1</sup>
	FY10 – 988 acres FY11 – 4,147 acres FY12 – 2,799 acres FY13 – 2,978 acres FY14 – 2,808 acres FY15 – 784 acres FY16 – 3,702 acres FY17 – 4,154 acres FY18 – 5,112 acres

**FY18 CFLRP Funded Projects:**

Forest	Project	Acres
ARP	Glen Haven	188
ARP	Magic Sky 2	304
ARP	Cottonwood/Glacier	378
ARP	Redfeather North Rx Burn	1,702
PSICC	Carrol Lakes	380
PSICC	Badger Gulch	224
PSICC	Raleigh Peak	665
PSICC	Wilson RX Burn	49
PSICC	Trout Creek RX Burn	140
PSICC	Wagon Tongue Rx Burn	451
PSICC	O'Brien Rx Burn	280

Forest	Project	Acres
PSICC	PPRD Force Account Thin	351

Total – 5,112

The calculated Enterprise Data Warehouse acres of footprints appeared to be understated when compared to FACTS activities layers (many of the WIT accomplishments are integrated targets off of core FACTS data, in checking WIT

Fiscal Year	Footprint of Acres Treated (without counting an acre of treatment on the land in more than one treatment category)
FY 2018	5,112 acres
Estimated Cumulative Footprint of Acres (2010 through 2018)	27,472 acres

**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 footprint acres were derived from projects (awarded stewardship and service contracts and the prescribed burns on both forests that were funded with CFLRP program funds (CFLN/R and “in lieu of funds”).

FOREST	PROJECT	FY	TOTAL ACRES	FOREST	PROJECT	FY	TOTAL ACRES	TOTALS BY FY
PSICC	Phantom #1 LTSC TO	2010	597	ARP	Taylor	2010	391	988
PSICC	Ryan Quinlan #1 LTSC TO	2011	356	ARP	Estes Valley-Walker Black	2011	903	
PSICC	Phantom #2 LTSC TO	2011	871	ARP	Walker Red	2011	682	
PSICC	Phantom #3 LTSC TO	2011	656	ARP	Thompson River 2	2011	679	4,147
PSICC	Phantom #4 LTSC TO	2012	507	ARP	West Mag	2012	286	
PSICC	Catamount 1 LTSC TO	2012	351	ARP	Redfeather 1	2012	586	
PSICC	Long John LTSC TO	2012	304	ARP	Boulder Heights	2012	115	
PSICC	Buffalo Creek LTSC 1 TO	2012	478	ARP	Kelly Dahl	2012	172	2,799
PSICC	Messenger Gulch LTSC 2 TO	2013	425	ARP	Gold Hill	2013	50	
PSICC	Broken Wheel LTSC TO	2013	406	ARP	Redfeather 2	2013	1,456	
PSICC	Crystal Creek TO	2013	412	ARP				
PSICC	Ponderosa #1 TO	2013	229	ARP				2,978
PSICC	Big Elk TO	2014	221	ARP	Creedmore	2014	167	
PSICC	Ridge TO	2014	745	ARP	Ward Jam	2014	406	
PSICC	Little Scraggy TO	2014	425	ARP	Gross	2014	450	
				ARP	Magic Sky	2014	394	2,808
PSICC	717 Service Contract	2015	784	ARP	No sales	2015	0	784
PSICC	PPRD Rx Burn (force acct)	2016	301	ARP	Deobligated Greenridge	2016		

FOREST	PROJECT	FY	TOTAL ACRES	FOREST	PROJECT	FY	TOTAL ACRES	TOTALS BY FY
PSICC	Deobligated-Little Scraggy	2016	-425	ARP	Deobligated Gold Hill	2016	-50	
PSICC	Painted Rocks IRSC	2016	151	ARP	Redfeather 3	2016	609	
PSICC	Phantom 5 IRSC	2016	246	ARP	Redfeather 4	2016	1,105	
PSICC	Hybrook IRSC	2016	537	ARP	Ridge (RFB)	2016	205	
PSICC	Eco Beaver IRSC	2016	582	ARP	Burnt-Blue Creek	2016	220	
PSICC	Tornado IRSC	2016	221	ARP				3,702
PSICC	Little Morrison	2017	197	ARP	Elkhorn IRSC	2017	165	
PSICC	Round Mountain	2017	250	ARP	Elkhorn Manual	2017	245	
PSICC	Skelton	2017	368	ARP	Matoons	2017	325	
PSICC	Payne Gulch	2017	431	ARP	Horse Creek IRSC	2017	135	
PSICC	Wilson RX Burn	2017	359	ARP	Redfeather RX Burn	2017	1,513	
PSICC	Trout Creek RX Burn	2017	166	ARP				4,154
PSICC	Badger Gulch	2018	224		Glen Haven	2018	188	
PSICC	Raleigh Peak TO	2018	665		Magic Sky 2	2018	304	
PSICC	Carrol Lakes	2018	380		Cottonwood/Glacier	2018	378	
PSICC	Trout Creek RX Burn	2018	140		Redfeather North Rx Burn	2018	1,702	
PSICC	Wilson Rx Burn	2018	49					
PSICC	Wagon Tongue Rx Burn	2018	451					
PSICC	O'Brien Rx Burn	2018	280					
PSICC	PPRD Force acct thinning	2018	351					5,112

9. Describe any reasons that the FY 2018 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? (Please limit answer to two pages).

**Colorado Front Range CFLRP cumulative accomplishments 2010-2018 per annual reports.**

Performance Measure	Code	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTALS	PROJECT EXPECTED OUTPUTS	% ACCOMPLISHED
CFLR/N funded acres (mechanical or manual fuels reduction)	None	988	4,147	2,799	2,978	2,808	784	3,702	4,154	4,665	<b>27,472</b>	<b>31,600</b>	<b>87%</b>
Green tons from small diameter and low value trees removed from NFS lands and made available for bio-energy production	BIO-NRG	5,514	1,128	459	260						<b>7,361</b>	<b>24,000</b>	<b>31%</b>
Acres of forest vegetation established	FOR-VEG-EST		1,047	1,100	1,564	1,199	996	1,347	934	2,228	<b>10,415</b>	<b>10,000</b>	<b>104%</b>
Acres of forest vegetation improved	FOR-VEG-IMP		5,562	2,181	5,758	5,414	3,095	4,105	2,516	5,261	<b>33,892</b>	<b>41,300</b>	<b>81%</b>
Acres of wildland/urban interface (WUI) high priority hazardous fuels treated to reduce the risk of catastrophic wildland fire	FP-FUELS-WUI	3,224	6,922	5,506	9,625	6,530	2,438	9,994	3,946	6,697	54,882		
Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildland fire	FP-FUELS-NON-WUI								171		171		
Number of acres treated to reduce the risk of catastrophic wildland fire	FP-FUELS-ALL	3,224	6,922	5,506	9,625	6,530	2,438	9,994	4,117	6,745	<b>55,101</b>	<b>63,800</b>	<b>86%</b>
Miles of stream habitat restored or enhanced	HBT-ENH-STRM					5			1		6	N/A	N/A
Acres of terrestrial habitat restored or enhanced	HBT-ENH-TERR		1,402	6,615	1,414	4,163	4,540	10,198	3,568	<b>3,224</b>	<b>35,124</b>	<b>11,666</b>	<b>301%</b>
Manage noxious weeds and invasive plants	INVPLT-NXWD-FED-AC	100		625	429	477	529	7,570	1,534	<b>2,533</b>	<b>13,797</b>	<b>5,600</b>	<b>249%</b>
Miles of property line marked/maintained to standard	LND-BL-RK-MAINT		21								<b>21</b>	<b>21.25</b>	<b>99%</b>



Performance Measure	Code	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTALS	PROJECT EXPECTED OUTPUTS	% ACCOMPLISHED
Miles of unauthorized road decommissioned	RD-DECOM			5		7			4		16	5	318%
Miles of closed and high clearance system roads receiving maintenance	RD-HC-MAINT		2	33	8	69					112	36	311%
Miles of passenger car system roads improved	RD-PC-IMP			1							1	18	6%
Miles of passenger car system roads receiving maintenance <sup>3</sup>	RD-PC-MAINT		9	52		243					304	61	497%
Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions	S&W-RSRC-IMP		43	9,763	3,003	881		196	2,820	2,266	21,792	9,805	222%
Number of stream crossings constructed or reconstructed to provide for aquatic organism passage	STRM-CROSMTG-STD			1							1	1	100%
Miles of system trail maintained	TL-MAINT-STD			110	9						119	113	105%
Acres of forestlands treated using timber sales	TMBR-SALES-TRT-AC			20	256				995	250	1,521		
Volume of Timber sold (CCF)	TMBR-VOL-SLD		6,678	11,889	6,175	5,141	8,108	7,150	2,771	5,216	40,762	62,000	66%

Going into the last year of CFLRP...Cumulative project accomplishment is compared with the 2013 project “lifetime” goals submission in the table above. Majority of the planned treatments for the 10 year period are on a trajectory to meet or have already exceeded expected cumulative outputs. Five performance outputs (see below) that are below the planned rate of progress (90% through FY2018) are associated with the decreased capacity of the Front Range Long Term Stewardship Contract (FRLTSC) starting in 2015. This contract was the primary contracting tool for implementing mechanical and manual fuels/restoration treatments on both forests from 2009-2014.

<sup>3</sup> Expected miles of passenger car system roads improved should have been designated as passenger car system roads receiving maintenance (497%).

- BIO-NRG & TMBR-VOL-SLD: The economical removal of biomass has been a challenge region-wide. From 2009 through 2018 commercial biomass was primarily produced via a long-term stewardship contract, some years better than others. Markets are limited along the Colorado Front Range where although some niche markets exist, larger commercial timber sales in dry cover types don't support high profit margins and are generally not supported.

## 10. Planned FY 2019 Accomplishments

Performance Measure Code	Unit of measure	Work Plan 2019	Planned Accomplishment For 2019	Amount (\$)
Acres of forest vegetation established FOR-VEG-EST	Acres		1,800	\$200,000
Manage noxious weeds and invasive plants INVPLT-NXWD-FED-AC	Acre		500	\$75,000
Miles of stream habitat restored or enhanced HBT-ENH-STRM	Miles			
Acres of terrestrial habitat restored or enhanced HBT-ENH-TERR	Acres			
Miles of road decommissioned RD-DECOM	Miles			
Miles of passenger car system roads improved RD-PC-IMP	Miles			
Miles of high clearance system road improved RD-HC-IMP	Miles			
Volume of timber sold TMBR-VOL-SLD	CCF		4,445 CCF	\$400,000
Green tons from small diameter and low value trees removed from NFS lands and made available for bio-energy production BIO-NRG	Green tons			
Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildland fire FP-FUELS-NON-WUI	Acre			
Acres of wildland/urban interface (WUI) high priority hazardous fuels treated to reduce the risk of catastrophic wildland fire FP-FUELS-WUI	Acres		5,468 acres	\$4,000,000

Please include all relevant planned accomplishments, assuming that funding specified in the CFLRP project proposal for FY 2019 is available. Use actual planned funding if quantity is less than specified in CFLRP project work plan.

**11. Planned accomplishment narrative and justification if planned FY 2019 accomplishments and/or funding differs from CFLRP project work plan** (no more than 1 page): If do want to compare lifetime goals to date, link here.

The planned accomplishments are based upon full program funding. Contracts are generally advertised for competition, with less obligations going towards the Front Range 10-Year Stewardship Contract. Prices for service items are anticipated to rise, and forest product markets continue to be uncertain. However we are optimistic that we can carry out expectations for a full program level and meet our commitments. FY19 accomplishments will continue to emphasize restoration treatments in ponderosa pine and dry mixed conifer ecosystems and hazardous fuels reduction in WUI

utilizing mechanical, manual, and prescribed fire treatments. A continued increased reliance on prescribed fire will be necessary to carry out full commitments. Partners continue to help fund hazardous fuels/restoration and noxious weed treatments within priority CFLRP areas.

#### Arapaho-Roosevelt National Forests

The ARP will continue to emphasize treatments in the Red Feather North area as well as in several other areas within the CFLRP footprint. The Forest will also initiate a longer term, 5-10 year planning strategy in 2019. The intent is to increase the pace and scale of restoration through a series of landscape scale planning projects in the Cache La Poudre, Big Thompson and St. Vrain watersheds that span from the Colorado-Wyoming border to the most southern boundary of the CFLR footprint. This longer term planning encompasses approximately 620,000 acres of private, state, and federal lands within the Northern Front Range of Colorado.

#### Pike and San Isabel National Forests

The PSICC will continue to emphasize treatments in the Upper Monument Creek EIS areas. The Forest will continue to work with existing and new contractors to secure services to complete work in the CFLRP area.

The PSICC will complete in December 2018, a new 5-year agreement with Colorado Springs Utilities who has been a previous partner for funding fuels reduction in their areas of concerns, within the CFLRP. CFLRP funds have been critical in matching CSU funds.

Applicable to both Forests:

- Both Forests continues to do work in the CFLRP area with Denver Water. We are in the third year of a five year agreement. Continuing to focus treatments in zones of concerns, the Forest will continue to draw on best science and collaboration as we continue to partner with Denver Water to reduce the risk of severe wildfire effects in their areas of concern.
- Contracting efforts in FY18 indicated that treatment prices continue to increase, although less of an increase than the previous year due to more experience for contractors who are a little more comfortable with bid prices. Depending on location and product type, projects with a significant amount of timber volume can keep prices lower, or in some areas product area a detriments and can drive prices higher. There is a need to continue doing market research to find out where forest product outlets are, and help make connections for contractors to be able to deliver wood at lower prices.

As both Forests move forward in the last year of CFLRP funding the challenges that were with the program from the start continue to be there, but we are able to manage them to complete and get close to expected accomplishments from the original proposal. Prices continue to increase, contractor capacity is known today but uncertain in the future. New contracting mechanism will be looked at to sustain the economic picture of getting work done in the CFLRP arear. There continues to be interest on both Forests, and the collaborative, to use prescribed fire as a primary tool to accomplish restoration projects.

**12. Please include an up to date list of the members of your collaborative if 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.

The primary collaborative group for the Colorado Front Range CFLR Project is the Front Range Roundtable. The Roundtable is a coalition of individuals from state and federal agencies, local governments, environmental and conservation organizations, the academic and scientific communities, and industry and user groups, all with a commitment to forest health and fire risk mitigation along Colorado's Front Range. The Roundtable's focus area encompasses 10 Front Range counties: Boulder, Clear Creek, Douglas, El Paso, Gilpin, Grand, Jefferson, Larimer, Park and Teller. There are over 300 members of the original collaborative with a core participating group of over 100 individuals.

Below is a list of the Landscape Restoration Team and their affiliation. This team is responsible for CFLR Project monitoring:



Rob Addington	The Nature Conservancy
Greg Aplet	The Wilderness Society
Tony Auciello	Jefferson County Open Space
Kevin Barrett	Colorado Forest Restoration Institute
Mike Battaglia	US Forest Service, RMRS
Teagan Blakey	Magnolia Forest Group
Jenny Briggs	US Geological Survey
Peter Brown	Rocky Mountain Tree-Ring Research
Cheyenne Brown	Colgate University Student
Mike Caggiano	Colorado State University
Jeff Cannon	Colorado Forest Restoration Institute
Marin Chambers	Colorado Forest Restoration Institute
Tony Cheng	Colorado State University
Sallie Clark	El Paso County
Erin Connelly	US Forest Service - Pike San Isabel National Forests
Michelle Connelly	Coalition for the Upper South Platte
Casey Cooley	Colorado Parks & Wildlife
Marc Dettenrieder	Teller County
Jennifer DeWoody	US Forest Service
Cindy Domenico	Boulder County
Marla Downing	US Forest Service
Carol Ekarius	Coalition for the Upper South Platte
Deanna Engelmann	USDA Forest Service
Jonas Feinstein	Natural Resources Conservation Service
Jim Gerleman	PSICC
Joe Huck	US Forest Service - Pike San Isabel National Forests
Chad Julian	Private citizen
Joe Sean Kennedy	US Forest Service, PSICC
Kathleen Krebs	Clear Creek County
David Laskey	Sugarloaf Fire Protection District
Lyle Laverty	Society of American Foresters
Jason Lawhon	The Nature Conservancy
Larry Lempka	Big Thompson River Coalition
Mike Lester	Colorado State Forest Service
Mark Martin	US Forest Service, ARP
Mike McHugh	Aurora Water
Kevin McLaughlin	US Forest Service, ARP
Ken Morgan	Colorado Parks & Wildlife
Andy Perri	Denver Mountain Parks
Brad Piehl	JW Associates
Joe Reale	City of Westminster
Kathleen Roman	Landowner
Tanner Scott	Student (Oregon State University)
Samantha Sherwood	Aurora Water
Nick Stremel	Boulder County Parks and Open Space
Rick Truex	US Forest Service, R2
Jeff Underhill	US Forest Service, PSICC
Susan Wagner	Magnolia Forest Group

**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.

#### Videos

- [Pike National Forest-Weston Pass Burn Scar Flooding](#)

#### Media Articles

##### Press Releases

- [Arapaho-Roosevelt National Forests, Redfeather Prescribed Burn, September 2018](#)
- [Pike National Forest Prescribed Burning Near Woodland Park, October 2018](#)
- [Pike National Forest Prepares for Prescribed Burning in Park County, September 2018](#)
- GTR 373: Front Range Forest Restoration Field Trip Invitation. North Front Range-September 12, 2018, South Front Range-September 26, 2018.

#### White Papers

- Barrett, K. and Cheng, T. (2018). [Front Range Roundtable Status of Knowledge](#). CFRI-1803
- Cannon, J., Barrett, K., Gannon, B. (2018). [Report on the potential application of CFLRP monitoring tools for development of Forest Plan monitoring Colorado Forest Restoration Institute](#). Colorado Forest Restoration Institute. CFRI-1802.
- DeAngelis, R, JB Cannon, WT Tinkham, SA Ex (2018) [Effects of spatial heterogeneity on understory solar radiation in a mixed conifer forest](#). Front Range Student Ecology Symposium, Colorado State University, February 2018, Fort Collins, CO.
- Elliott, S, JB Cannon, JS Briggs (2018) [Spatial and temporary effects of collaborative restoration on Front range ponderosa pine dominated forests](#). Front Range Student Ecology Symposium, Colorado State University, February 2018, Fort Collins, CO.
- Schuetter, A, JB Cannon, KJ Barrett (2018). [Effects of restoration treatments and adaptive management on forest structure in ponderosa pine forests of the Colorado Front Range](#). Celebrate Undergraduate Research and Creativity Showcase. April 2018. Fort Collins, CO.

#### Research Highlights

- Cannon, J. et al. (2018). [Effects of forest restoration treatments and wildfires on tree spatial patterns in the Colorado Front Range](#). 2017 Fire Congress Research Highlight

#### Journal Articles

- Battaglia, M., Gannon, B., Brown, P., Fornwalt, P., Cheng, T., Huckaby, L. (2018). [Changes in forest structure since 1860 in ponderosa pine dominated forests in the Colorado and Wyoming Front Range, USA](#). Forest Ecology and Management. 422, 1470160. doi: 10.106/j.foreco.2018.04.010.
- Cannon, J.B., Barrett, K.J., Gannon, B.B., Addington, R.N., Battaglia, M.A., Fornwalt, P.J., Aplet, G.H., Cheng, A.S., Underhill, J.L., Briggs, J.S., Brown, P.M., 2018. [Collaborative restoration effects on forest structure in ponderosa pine-dominated forests of Colorado](#). For. Ecol. Manage. 424, 191-204. Doi.org/10.1016/j.forco.2018.04.026.

- Malone, S., Fornwalt, P., Battaglia, M., Chambers, M., Iniguez, J., Seig, C. (2018). [Mixed-severity fire fosters heterogeneous spatial patterns of conifer regeneration in a dry conifer forest](#). *Forests*, 9. doi 10.3390/f9010045.

General and Technical Reports

- Addington, R. et al. (2018). [Principles and practices for the restoration of ponderosa pine and dry mixed-conifer forests of the Colorado Front Range](#). USDA Forest Service – General Technical Report RMRS-GT (373 RMRS-GTR), 1-129.

Signatures:

Recommended by (Project Coordinator(s)): \_\_\_\_\_

Approved by (Forest Supervisor: Arapaho-Roosevelt National Forest): \_\_\_\_\_

Approved by (Forest Supervisor: Pike and San Isabel National Forest): \_\_\_\_\_

Draft reviewed by (collaborative chair or representative): \_\_\_\_\_