2019 CFLRP Ecological Indicator Progress Report

OVERVIEW

Introduction

In 2011, the National Forest Foundation convened CFLRP participants to develop a set of national indicators. The resulting five indicators are economic impacts, fire risk and costs, collaboration, leveraged funds, and ecological condition. Data to support these five indicators comes from a number of sources, including the Treatment for Restoration Economic Analysis Toolkit, collaboration surveys conducted by NFF, and the Annual Reports.

Projects first reported on ecological indicators in 2014. Since then, the CFLRP staff in the US Forest Service Washington Office have worked with colleagues and partners to review and update to template to make improvements while maintaining a consistent protocol to 2014. The intent of the 2019 CFLRP Ecological Indicator Progress Report is to better understand your progress in advancing ecological outcomes. It is not intended to capture everything about your monitoring activities.

To aid you in filling out this report, we recommend that you read the new 2019 Guidance Document. We also recommend that you reference your past Annual Reports and your 2014 Ecological Indicator Progress Reports. For additional help, please email CFLRP@fs.fed.us.

We appreciate the time and energy you dedicate to completing this progress report. This information is critical for understanding the ecological outcomes of your work, telling the national story, supporting communication and transparency, and sharing successful approaches and practices across the nation.

Thank you!

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2019 CFLRP Ecological Indicator Progress Report

Project Name: Colorado Front Range-CFLR 004 State: CO

FIRE REGIME

Narrative - *Note: All boxes in this template will scroll, so you have as much space as you need.*

1. Did you make any changes to your desired condition(s) for fire regime as compared to the 2014 Ecological Indicator Report?
Please briefly describe:

Yes ☐ No ☑

There were no significant changes made to the desired conditions statement for fire regime from the 2014 Ecological Indicator Report. The 2014 desired condition was to establish a more characteristic fire regime (100 % change relative to the desired condition) across 7.9% of the landscape area by 2019, with changes measured on several elements as described in the 2014 report and 2016/2018 monitoring plan. However, using desired conditions for forest structures at multiple spatial scales as a proxy for desired conditions for fire regimes, there have been refinements to those forest structure desired conditions since 2014. The initial refinement occurred via a work group convened by the Colorado Forest Restoration Institute and culminated in a technical report, "Desired Forest Structures for a Restored Front Range" (Dickinson et

2. Did you make any changes to your monitoring methodologies for fire regime as compared to the 2014 Ecological Indicator Report? Please briefly describe:

Yes ☑ No ☐

Monitoring methodologies have generally not changed although there is a push to move to adapting the monitoring guidelines themselves (Lindenmayer and Likens 2009), which encourages monitoring activities to evolve as new information becomes available. This would result in implementation monitoring being completed most frequently, likely within a year of treatment. Effectiveness monitoring will be completed less frequently, as larger datasets are required for analysis. Adaptive monitoring will be continuous, as monitoring activities are always subject to review as new information, methods, and funding become available. The original monitoring plan from 2011 presented a basic plot design, based on CSE methods, to compare pre- and post-treatment conditions and assess desired conditions. The evolution of the Ecological

3. Did you use any new or updated baseline data for evaluating your fire regime progress for the purposes of this report?
Please briefly describe:

Yes ☑ No ☐

A collaborative applied research effort occurred in parallel with the CFLRP project to develop reference conditions for Ponderosa pine forests across the Front Range landscape. The project involved scientists from the Colorado Forest Restoration Institute, Rocky Mountain Tree Ring Research, and the USDA Forest Service ' s Rocky Mountain Research Station. The results (Battaglia et al. 2018) provided science-based baseline data against which to evaluate CFLRP treatments towards desired forest structural and fire behavior characteristics within projects and across projects. Treatments from 2010-2013 were assessed against this baseline (Cannon et al. 2018). An updated assessment of treatments between 2014-2019 has been drafted and was presented to the collaborative group in Fall 2019, and is in process of publication

4. Did your projects experience any unanticipated developments that positively or negatively affected expected progress towards your desired conditions for fire regime? (e.g. wildfire in the project area, litigation outcome, change in collaborative participation, etc.)

In 2015, the "Forest-To-Faucets" partnership agreement between The US Forest Service and Denver Water was renewed to jointly fund forest restoration and wildfire mitigation treatments on National Forest Systems lands affecting Denver Water ' s sourcewater, much of which overlaps with the Front Range CFLRP project area. Agreements with Aurora Water, Colorado Springs Utilities, and Northern Water (through the Colorado Big-Thompson Headwaters Partnership) have also expanded funding and treatments within the Front Range CFLRP footprint. In 2015, the principal contractor of the Front Range Long Term Stewardship Contract (LTSC), West Range Reclamation LLC (WRR), filed for bankruptcy and entered court proceedings in an effort to reorganize and keep the company solvent. This situation has negatively affected the ability of the Arapaho-Roosevelt NF and Pike-San Isabel NF to acquire services to complete activities within the CFLRP area. Because of this, CO Front Range CFLRP accomplishments in FY15 were lower than planned. In late FY15, there was a WO transfer of funds for nationwide fires suppression. This transfer directly affected the ability of both Forests to be able to contract services for planned activities within the CFLRP program area. CFLN

5. What were the most difficult barriers or challenges you experienced in progressing towards your desired conditions for fire regime? If you adapted to address these challenges please provide a brief description of how.

Implementing prescribed burning as part of the CFLRP has been challenging for a myriad of social, political, economic, and logistical reasons, thus severely limiting the use of fire as a management tool across the ARP and PSI in the initial years of the program. As the impetus and ability for the USFS to implement broadcast burning has been increasing, the LRT initiated the formation of a sub-team to develop desired conditions and protocols for monitoring fire effects. As of 2018, protocols have been developed to monitor first order fire effects on vegetation and fuels, but no monitoring on fire behavior has been adopted. One of the later CFLRP projects, Forsythe II, has been fraught with social conflict involving local community residents. While the project has faced opposition from some community residents, it also has been supported by the town council, the county, and many local residents (Jahn and Brenkert-Smith 2019). A multi-party monitoring process was instituted to address points of conflict during the implementation phase and is ongoing. Although significant headway was made analyzing spatial heterogeneity at both the stand and landscape scale using these methods, the relatively abstract metrics produced by FRAGSTATS led to some confusion among

6. Did you include the effects of treatments on areas adjacent to the active treatment area? Yes ☑ No ☐

If yes, please briefly describe your methodology for including these adjacent acres, and describe any work conducted across land ownership in support of desired conditions for fire regime.

Proposed actions initiated and analyzed after 2010 did include a consideration of the effect of treatments on adjacent areas. For example, the Forsythe II project on the Boulder District tiered to the Town of Nederland ' s and Boulder County ' s community wildfire protection priority areas based on fire risk analyses utilizing simulated fire behavior modeling. The Upper Monument Creek project on the Pikes Peak Ranger District assessed potential fire behavior and spatial arrangement of fuel treatment-based forest restoration treatment areas relative to private lands and wildland-urban interface communities on the eastern boundary adjacent to the communities of Palmer Lake and Monument, and relative to the properties managed by the Air Force Academy. The Magic Sky and Red Feather CFLRP projects on the Canyon Lakes Ranger District were designed and strategically located relative to private property and wildland-urban interface boundaries, and structured to coincide with fuel treatments -- both mechanical and prescribed fire -- occurring or planned on those adjacent properties. Spatial fire risk assessment tools and technologies utilizing probabilistic fire behavior models (e.g., FLAMMAP, FSIM) were the primary methodology.

Desired Conditions

*In this report, the term "**desired conditions**" refers to landscape and resource conditions (as defined collaboratively by stakeholders and land managers) that you are seeking to achieve and maintain for your CFLRP landscape over the next 10+ years. Desired conditions are outcome-driven not output-driven, and should link to your project's CFLRP proposal while being measurable. (Note: The term "desired condition" is used somewhat differently in the Forest Service's Land Management Planning Process. In that context, it is not time bound, and often represents long-term social, economic and ecological goals, while the term "objective" is used to represent specific, measurable and time-bound benchmarks to be achieved while working toward desired conditions in a forest plan area.) In this report, the term "**landscape**" refers to the landscape identified in your CFRLP project proposal or in subsequently-approved proposal edits. See cover page for links to guidance.*

7. Project-scale Desired Conditions Target for Fire Regime:

L00	% change (relative to the desired condition) occurs across	L00	% of the project areas by	09/30/2019
	% change (relative to the desired condition) occurs across		% of the project areas by	

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

For projects in the lower montane, basal area and trees-per-acre are reduced by an average of 64% and 78%, respectively, in order to reduce the potential for high intensity active crown fire and promote low-to-moderate intensity surface and passive crown fires. (metrics derived from Battaglia et al. 2018 comparing historic vs. current forest stand structure)

Example: Treatments in the project area result in a 23% reduction in potential flame length.
Example: 75% of all prescribed burn projects meet prescription objectives as quantified in burn plan.

8. Landscape-scale Desired Conditions Target for Fire Regime:

L00	% change (relative to the desired condition) occurs across	7.9	% of the landscape area by	09/30/2019
	% change (relative to the desired condition) occurs across		% of the landscape area by	

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

At the 6th-level (HUC-12) watershed scale, restoration treatments will be concentrated in focal watersheds in the larger CFLRP project area so that up to 50% of the watershed will be a mosaic of forested and nonforested patches 10 acres or smaller, and up to 50% of the watershed will be a mosaic of forested and nonforested patches up to 25 acres in size. This is anticipated to result in a mix of low-to-moderate intensity surface

Examples: Modeled ecological departure indicates that forest vegetation is restored to Vegetation Condition Class 1 with low fire hazard across 51% (105,183 acres) of the CFLR landscape; Fuel models indicate reduced likelihood of supporting a stand replacing fire across 8.5% of the CFLR landscape (73,000 acres); Fire-adapted landscapes transition from shrub-dominant understory fuel model to a grass/forb dominant understory fuel model across 50% of the CFLR landscape.

9. Please select the broader goals that are central to your desired condition(s) for fire regime for the Project-scale (P) and Landscape-scale (L) :

P	L	
☑	☑	Reduced risk/likelihood of uncharacteristic wildfires (high severity, widespread, high mortality, active crown fire/crown fire initiation)
☑	☑	Re-establish natural fire regimes and move landscape to historical range of variability and/or natural range of variability
☑	☑	Restore/maintain fire dependent and tolerant species
☐	☐	Restore/maintain native species
☑	☑	Restore/maintain heterogeneity (species, size classes)
☑	☑	Increase use of prescribed fires
☐	☐	Other. Please describe:

10. Please select the key outcomes you are hoping to achieve on the landscape through attainment of the broader goals you selected above:

- ☑ Increase options/opportunities for managers to control/manage wildfires
- ☑ Protect communities and high valued resources/reduce risk of loss
- ☑ Protection of water quality/supply
- ☑ Public and firefighter safety
- ☑ Reduced fire supression costs and avoided costs
- ☐ Other. Please describe:

11. Given these goals, please state the evaluation metric(s) you are using to monitor progress towards your desired conditions for fire regime for this report. Note: This evaluation metric is something you are measuring or counting to monitor fire regime change. It has a unit of measurement attached to it.

Decrease basal area
• Increase quadratic mean diameters
• Increase the ratio of ponderosa pine to other conifers

Examples of fire regime evaluation metrics: basal area in square feet per acre (for tree density), quadratic mean diameter in inches (for tree sizes), litter and duff depths in centimeters (for fire hazard), percent canopy cover (for openness), fuels treatment effectiveness, tons of fuel loads removed (for fire hazard), avoided costs

Data and Methodology

12. Select the type(s) of monitoring you used to assess Project-scale (P) and Landscape-scale (L) progress towards fire regime desired conditions for this report. Select all that apply:

P	L	
☑	☑	**Baseline Data Collection** (i.e. was data collected prior to treatment to be used for later comparison?)
☑	☑	**Accomplishment Reporting** (i.e. was progress tracked using acres and miles reported?)
☑	☑	**Implementation Monitoring** (i.e. were the treatments implemented as prescribed?)
☑	☑	**Effectiveness Monitoring** (i.e. were treatments effective at meeting the stated objectives?)
☐	☐	**Effectiveness Monitoring Pilot Study** (i.e. was a trial run conducted to assess considerations of crafting an effectiveness monitoring plan?)
☐	☐	**Ecological Impacts Monitoring** (i.e. were there any unforeseen ecological consequences that could compromise treatment success?
☐	☐	**Other.** Please describe:

13. Select the methodologies used to assess Project-scale (P) and Landscape-scale (L) progress towards fire regime desired conditions for this report. Select all that apply and provide a brief description for each:

P	L	
☑	☑	Field-based sampling/plots:
☑	☑	Remote sensing: ☐LiDAR ☑ Aerial photography ☑ NAIP ☐ Landsat ☐ Other:
☐	☐	Treatments implemented (e.g. acres or miles accomplished):
☑	☐	Modeling (include type and indicators used): FVS-FFE, flame length, surface fireline intensity, crowning index
☐	☐	Measuring a reduction in the fire risk index:
☑	☐	Observation/expert opinion:
☑	☐	Fuels treatment effectiveness:
☑	☑	GIS analysis: See methods in Cannon et al. 2018. Forest Ecology & Management
☐	☐	Other:

14. Where is the data that is being used for monitoring Project-scale (P) and Landscape-scale (L) progress toward fire regime desired conditions being stored? Select the databases categories that apply and provide a description of the specific datasets being used. Include links if available:

P	L	
☑	☑	FSVeg:
☐	☐	Forest Inventory and Analysis (FIA):
☐	☐	Fuels Treatment Effectiveness Report Database:
☐	☐	GNN:
☐	☐	VMap:
☐	☐	Feat-Firemon Integrated Database:
☐	☐	FACTS (please select performance measure): ☐ FP-FUELS-NON-WUI ☐ FP-FUELS-WUI ☐ FOR-VEG-EST ☐ FOR-VEG-IMP ☐ OTHER:
☑	☑	Local database: Password protected Box cloud storage hosted by the Colorado Forest Restoration Institute at Colorado State University.
☐	☐	Inspection reports/contract record:
☐	☐	Other:

Project-scale scoring

From the beginning, CFLRP intended to shift towards desired conditions at the landscape-scale. As the disturbances and processes of interest occur at a landscape-scale, we need a landscape-scale assessment. It's a challenge to look at the impacts at that scale, given the scale itself as well as time delays (e.g. it takes more time to shift outcomes at landscape-scale than project-scale). While landscape-scale is the focus, project-scale assessments allow projects to bring in their monitoring data and look at treatment outcomes.

Each management action funded through CFLRP will have its own project-level objectives that are designed to contribute to achieving desired conditions at larger scales. Project-scale scoring should reflect how well the results of an individual management activity met the objectives for that project. Individual projects may not meet every desired condition of the CFLRP project. Project-scale scoring is conducted by the multi-party monitoring group following completed management activities.

An individual activity might not need to lead to a fully restored acre, but if it sets the landscape up for the next treatment it may still get a good rating. For example if a successful thinning doesn't restore a fire regime, but it sets up landscape for subsequent burns that might, it could still receive a "Green" rating. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to Guidance Document for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across 75% or more of our CFLRP project areas.
- **Yellow** = Expected progress is being made towards desired conditions across 26% - 74% of our CFLRP project areas.
- **Red** = Expected progress is being made towards desired conditions across 25% or less of our CFLRP project areas.

Ecological Indicator	Green, Yellow, or Red score and % of the CFLRP project areas resulting in measurable progress as defined above	Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.
Fire Regime	Green, 100%	YES

Please briefly describe how you calculated your score.

Annual reports quantifying changes between pre- and post-treatment forest structure and simulated fire behavior provide supporting evidence for this score. Additionally, meeting summaries are available from Peak Facilitation of annual CFLRP monitoring "jam sessions" arriving at general agreement of progress towards project-scale desired conditions.

Scoring for National Reporting

Landscape-scale scoring

Few (if any) CFLRP-funded Landscapes propose to meet every proposed desired condition on every acre or achieve landscape-scale objectives through the mechanical treatment of every acre within their landscape boundary. Rather, multiple projects with multiple objectives (fire risk reduction, wildlife habitat improvement, stream restoration, etc.) should facilitate meeting these broader objectives. Scoring at the landscape-scale reflects the degree to which individual Landscapes are moving towards Desired Conditions at broader spatial extent. Landscape-scale scoring is conducted by the multi -party monitoring group at each Landscape.

"Expected progress" will be defined using 10-year benchmarks for FY 2010 projects and 8-year benchmarks for FY 2012 projects for each desired condition based on a percentage of the lifetime outcome specified for the landscape in each proposal. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to Guidance Document for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across [8] % of our CFLRP landscape area.
- **Yellow** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.
- **Red** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.

Ecological Indicator	Green, Yellow, or Red score and % of the landscape across which progress is being made towards desired conditions	Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.
Fire Regime	Green, 8%	YES

Please briefly describe how you decided on the percentage thresholds used above for the scoring categories and how you calculated your score.

In 2014, a subgroup of the Landscape Restoration Team developed desired conditions for restored Front Range ponderosa pine and dry mixed-conifer forests at the stand and landscape scales. For the landscape scale metrics and thresholds, the team reviewed available scientific research estimating patch sizes of fire severity and tree mortality associated with fire regimes prior to widespread fire exclusion following Euro-American settlement in the Rocky Mountains in the 1860s and beyond. Referencing the ranges of percentages of area burned with different patch sizes of severity, the team identified the 50% area threshold composed of 1-10 acre forested and nonforested patches, and 50% area threshold composed of up to 25 acre forested and nonforested patches.

2019 CFLRP Ecological Indicator Progress Report

Project Name: Colorado Front Range State: CO

WATERSHED CONDITION

Narrative - *Note: All boxes in this template will scroll, so you have as much space as you need.*

☐ If watershed condition is not part of your CFLRP proposal and landscape restoration strategy, please let us know by checking this box.

1. Did you make any changes to your desired condition(s) for watershed condition as compared to the 2014 Ecological Indicator Report? Please briefly describe: **Yes** ☐ **No** ☑

Since 2014 monitoring report, desired conditions have changed within 7 of the 24 CFLRP watersheds. Recent efforts to re-assess watershed conditions and update WCATT have been made and are in draft form pending completion of an interdisciplinary team review. In all 7 cases watersheds moved from Non-Functional to Functional-at-risk. Most improvements were due to CFLRP treatments, natural recruitment resulting in significant riparian improvement, and Burned Area Emergency Response Treatments.

2. Did you make any changes to your monitoring methodologies for watershed condition as compared to the 2014 Ecological Indicator Report? Please briefly describe: **Yes** ☐ **No** ☑

In 2017 a CFLRP Watershed Health Subgroup formed to develop monitoring and modeling methods to assess the effects of CFLRP fuel treatments on post-fire erosion and sedimentation at relevant spatial scales. The Proposed Desired Conditions and Processes to Monitor include:
1. Reduce potential for damaging post-fire erosion and sediment fate and transport to municipal water supplies and infrastructure
a. Channel erosion

3. Did you use any new or updated baseline data for evaluating your watershed condition progress for the purposes of this report? Please briefly describe: **Yes** ☐ **No** ☑

Most watershed projects typically take 3-5 years to indicate even the slightest changes. Yes, the Forest used FACTS and WIT database. Watershed improvement work is on the forefront of Forest priorities. Therefore, watershed improvement projects include multiple program funding in addition to CFLRP contributions. WCATT changes are made in an interdisciplinary format. In a given watershed, treatments include vegetation management practices, fuels reduction, road treatments, post fire hill slope and stream channel treatments, and natural recovery enhancement through temporary closures. To name a few, vegetation, stream channel, and hill slope treatment projects have been completed

4. Did your projects experience any unanticipated developments that positively or negatively affected expected progress towards your desired conditions for watershed condition? (e.g. wildfire in the project area, litigation outcome, change in collaborative participation, etc.)

2012 Waldo Canyon Fire slowed progress down immensely in 2012-2014 due to post fire flood threats. The barren fire burn scar negatively affected progress initially. As new partnerships developed watersheds in the burn scar began to show improvement. Improved watershed condition changes are reflected in the current draft WCATT and are pending interdisciplinary review. Concurrent to Waldo Canyon landscape response to post fire , Hayman burn scar improvement began to expand using some CFLRP funding. Draft WCATT changes have been made to reflect the positive impacts.

5. What were the most difficult barriers or challenges you experienced in progressing towards your desired conditions for watershed condition? If you adapted to address these challenges please provide a brief description of how.

Limited human resources responding to Waldo Canyon post fire storm events and other fires on the Forest outside the CFLRP boundary, slowed down development and implementing new CFLRP projects.

The complexities of monitoring effects at the stand or landscape scale of CFLR treatments, which impact a very small percentage of the landscape, has proven challenging. The expertise and time commitment needed to run complicated fire behavior and hydrological models has

6. Are you using the Priority Watershed(s) identified through the Watershed Condition Framework to focus CFLRP watershed restoration work and monitoring for this report? Yes ☑ **No** ☐ **Our CFLRP does not have Priority Watersheds** ☐

If no, please briefly describe why you are not using the Priority Watersheds:

If yes, is there a Watershed Restoration Action Plan (WRAP) developed for the Priority Watershed(s)? Yes ☑ No ☐

7. Our Priority Watershed(s)of focus for this report cover 25 % of the CFLRP landscape

8. Please select up to three conditions in each category for why it was chosen as a Priority (these are available in the WCATT entry):

Category 1: Resource Values
- ☐ Wilderness
- ☐ Wild and Scenic River
- ☐ Experimental Watershed
- ☑ Municipal Watershed
- ☐ Outstanding Resource Water
- ☐ Species protection area
- ☐ Class 1 Air Shed
- ☐ Other:

Category 2: Concerns and Threats
- ☑ Water Quality
- ☐ Water Quantity
- ☐ Riparian Structure and Function
- ☐ Species Habitat
- ☑ Wildfire Risk
- ☐ Invasive Species
- ☑ Other: Post Fire response

Category 3: Opportunities
- ☑ Improve Condition
- ☐ Maintain Condition
- ☐ Potential Partnership
- ☑ Non-NFS Land Collaboration
- ☐ Larger Scale Restoration
- ☐ Leverage FS funds
- ☐ Socio-economic
- ☑ Other: Leverage partnership

Desired Conditions

*In this report, the term "**desired conditions**" refers to landscape and resource conditions (as defined collaboratively by stakeholders and land managers) that you are seeking to achieve and maintain for your CFLRP landscape over the next 10+ years. Desired conditions are outcome-driven not output-driven, and should link to your project's CFLRP proposal while being measurable. (Note: The term "desired condition" is used somewhat differently in the Forest Service's Land Management Planning Process. In that context, it is not time bound, and often represents long-term social, economic and ecological goals, while the term "objective" is used to represent specific, measurable and time-bound benchmarks to be achieved while working toward desired conditions in a forest plan area.) In this report, the term "**landscape**" refers to the landscape identified in your CFRLP project proposal or in subsequently-approved proposal edits. See cover page for links to guidance.*

9. Project-scale Desired Conditions Target for Watershed Condition:

)	% change (relative to the desired condition) occurs across	L00	% of the project areas by	09/30/2019
	% change (relative to the desired condition) occurs across		% of the project areas by	

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

The numbers are based on current overall rate of change progress as recorded in WCATT. For example, on the Pike and San Isabel NF since 2010, 24 of the 64 watershed have project level treatments. 7 of the 24 watersheds moved from non-functional to functional-at-risk. Doubling the current %change over the next 10 years is anticipated if funding and human resources remain the same barring any large natural

Examples: Over 50% of roads that will be used for activities in project areas have received or are planned for BMPs; Over 170 acres of riparian area are improved and floodplain reconnected, 2 miles of stream are restored, and dam removal results in 13 miles of fish passage.

10. Landscape-scale Desired Conditions Target for Watershed Condition:

)	% change (relative to the desired condition) occurs across	7.9	% of the landscape area by	09/30/2019
	% change (relative to the desired condition) occurs across		% of the landscape area by	

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

Desired Condition Target percentage is not calculated for this indicator because we anticipate that any changes in watershed condition will not be either measurable or significant during the project time frame, due to the minor amount of treated area within the CFLR Project Area when measured at the landscape scale.

Examples: 50% of the essential projects identified in the watershed WRAP are implemented; Watershed Condition Classification indicates that 14 of the 17 subwatersheds (82% of the CFLRP Landscape Area) are in Condition Class 1 (Properly Functioning); The Watershed Condition Classification for the fire regime and wildfire indicators are improved for 17% of the landscape (30% of the expected treatment area).

11. Please select the indicator(s) below related to watershed condition that you are trying to affect to achieve your quantifiable desired condition(s):

- [x] Water quality
- [ ] Water quantity
- [ ] Aquatic habitat (fragmentation, woody debris, channel shape and function)
- [ ] Aquatic biota (life-form presence, native species, exotic/invasive species)
- [ ] Improve riparian/wetland vegetation condition
- [ ] Roads and trails (road density, road maintenance, proximity to water, mass wasting)
- [x] Soils (erosion, productivity, contamination)
- [ ] Fire regime and wildfire (fire condition class, wildfire effects)
- [ ] Forest cover
- [ ] Rangeland vegetation
- [ ] Terrestrial invasive species (extent and rate of spread)
- [ ] Forest health (insects and disease, ozone)
- [ ] Other. Please describe:

12. **Please select the actions you are implementing to work towards your desired condition(s):**

- [ ] Road decommissioning
- [x] Road maintenance and/or improvement
- [ ] Trail maintenance and/or improvement
- [x] Mechanical thinning
- [x] Prescribed fire/controlled burn
- [x] Culvert replacement
- [ ] Reintroduction of native species
- [x] Removal of exotic/invasive species
- [ ] Other. Please describe:

13. Please state the evaluation metric(s) you are using to monitor progress towards your desired conditions for watershed condition.
Note: This evaluation metric is something you are measuring or counting to monitor watershed condition. It has a unit of measurement attached to it.

Reduction of fuels, thinning of Forest by treatments, mastication, controlled fire, number of miles of road decommissioning, road maintenance and/or improvement and photo points of stream channel work. While the Forest is not actively collecting stream sediment data, the Forest is aware that CDPHE monitors water quality for several streams within the CFLRP footprint.

Examples of evaluation metrics: Fine sediment volume (mL), fine sediment weight (g), basal area in square feet per acre (for tree density), number of woody debris pieces in a specific size class per stream mile (for fish habitat), stream flow rate (liters/sec), miles of road decommissioned (miles), fish population (number of fish per sweep).

Data and Methodology

14. Select the methodologies used to assess Project-scale (P) and Landscape-scale (L) progress towards watershed condition desired conditions in this report. Select all that apply and provide a brief description for each:

P	L	
☑	☑	National BMP monitoring (protect water quality):
☐	☐	Streambed coring:
☐	☐	Float method (water flow):
☐	☐	Current meter (water flow):
☐	☐	Fish occupancy/use surveys:
☐	☐	Ground-based photo points or photo plots:
☐	☐	Aerial surveys, aerial photography, or remote sensing:
☐	☑	GIS analysis: isk Analysis Decision Support model developed by Ben Gannon at CFRI
☐	☐	Treatments implemented (e.g. acres or miles accomplished) used as proxy for monitoring outcomes:
☐	☑	Modelling used as proxy for monitoring outcomes: Risk Analysis Decision Support model developed by Ben Gannon at CFRI
☐	☐	Other:

15. Where is the the data that is being used for monitoring Project-scale (P) and Landscape-scale (L) progress toward watershed condition being stored? Select the database categories that apply and provide a description of the specific datasets being used. Include links if available:

P	L	
☐	☑	GIS database: Forest level database
☐	☐	County database:
☐	☐	State database:
☐	☐	Tribal database:
☐	☐	Citizen Science database:
☐	☐	Watershed Classification and Assessment Tracking Tool (WCATT):
☐	☐	USFS database of record (e.g. FACTS, WIT, WorkPlan, etc.): *please select performance measure from the table below*
☐	☐	Other:

Performance Measure Shorthand	Description	Database	P	L
BIO-NRG	Green tons from small diameter and low value trees removed from NFS lands and made available for bio-energy production	TIM	☐	☐
FOR-VEG-EST	Acres of forest vegetation established	FACTS	☐	☐
FOR-VEG-IMP	Acres of forestland vegetation improved	FACTS	☐	☐
FP-FUELS-NON-WUI	Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildand fire	FACTS	☐	☐
FP-FUELS-WUI	Acres wildland/urban interface (WUI) high-priority hazardous fuels treated to reduce the risk of catastrophic wildland fire	FACTS	☐	☐
HBT-ENH-LAK	Acres of lake habitat restored or enhanced	WIT	☐	☐
HBT-ENH-STRM	Miles of stream habitat restored or enhanced	WIT	☐	☐
HBT-ENH-TERR	Acres of terrestrial habitat restored or enhanced	WIT	☐	☐
INVPLT-NXWD-FED-AC	Highest priority acres treated annually for noxious weeds and invasive plants on NFS lands	FACTS	☐	☐
INVSPE-TERR-FED-AC	Highest priority acres treated for invasive terrestrial & aquatic species on NFS lands	FACTS	☐	☐
RD-DECOM-NON-SYS	Miles of road decommissioned (non-system)	WIT	✓	✓
RD-DECOM-SYS	Miles of road decommissioned (system)	ROADS	☐	☐
RD-HC-IMP	Miles of high clearance system roads improved	ROADS	☐	☐

Performance Measure Shorthand	Description	Database	P	L
RD-HC-MAIN	Miles of high clearance system roads receiving maintenance	ROADS	☐	☐
RD-PC-IMP	Miles of road reconstruction and capital improvement	ROADS	☐	☐
RD-PC-MAIN	Miles of system roads receiving maintenance	ROADS	☐	☐
RG-VEG-IMP	Acres of rangeland vegetation improved	FACTS	☐	☐
S&W-RSRC-IMP	Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions	WIT	✓	✓
SP-NATIVE-FED-AC	Number of priority acres treated annually for native pests on Federal lands	FAD	☐	☐
STRM-CROS-MITG-STD	Number of stream crossings constructed or reconstructed to provide for aquatic organism passage	WIT	✓	☐
TL-IMP-STD	Miles of system trail improved	TRAILS	☐	☐
TL-MAINT-STD	Miles of system trail maintained	TRAILS	☐	☐
TMBR-SALES-TRT-AC	Acres of forestlands treated using timber sales	FACTS	✓	✓
TMBR-TRT	Acres of forestlands treated to achieve healthier conditions	FACTS	✓	✓
WTRSHD-CLS-IMP-NUM	# of watersheds moved to an improved condition class or sustained in properly functioning condition (Class 1)	WCATT	✓	✓

16. Please describe why the datasets or performance measures you selected in Question 15 above are <u>appropriate for assessing progress</u> towards your watershed desired conditions.

WIT datasets records annual treatments for HBT-ENH-STRM, HBT-ENH-TERR, RD-DECOM-NON-SYS, S&W-RSRC-IMP, STRM-CROS-MTG-STD, and FACTS for TMBR-SALES-TRT-AC, TMBR-TRT, and WCATT for WTRSHD-CLS-IMP-NUM. WIT and FACTS data sets include number of acres or miles treated and / or benefiting acres from treatment. Some treatments have different outcomes on fire regime, watershed condition, fish and wildlife

Project-scale scoring

From the beginning, CFLRP intended to shift towards desired conditions at the landscape-scale. As the disturbances and processes of interest occur at a landscape-scale, we need a landscape-scale assessment. It's a challenge to look at the impacts at that scale, given the scale itself as well as time delays (e.g. it takes more time to shift outcomes at landscape-scale than project-scale). While landscape-scale is the focus, project-scale assessments allow projects to bring in their monitoring data and look at treatment outcomes.

Each management action funded through CFLRP will have its own project-level objectives that are designed to contribute to achieving desired conditions at larger scales. Project-scale scoring should reflect how well the results of an individual management activity met the objectives for that project. Individual projects may not meet every desired condition of the CFLRP project. Project-scale scoring is conducted by the multi-party monitoring group following completed management activities.

An individual activity might not need to lead to a fully restored acre, but if it sets the landscape up for the next treatment it may still get a good rating. For example if a successful thinning doesn't restore a fire regime, but it sets up landscape for subsequent burns that might, it could still receive a "Green" rating. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to Guidance Document for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across 75% or more of our CFLRP project areas.
- **Yellow** = Expected progress is being made towards desired conditions across 26% - 74% of our CFLRP project areas.
- **Red** = Expected progress is being made towards desired conditions across 25% or less of our CFLRP project areas.

Ecological Indicator	Green, Yellow, or Red score and % of the CFLRP project areas resulting in measurable progress as defined above	Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.
Watershed Condition	Yellow, 29%	YES

Please briefly describe how you calculated your score.

Scores were calculated based on area treated within all watersheds. For example, on the Pike and San Isabel there are 64 six field HUCs in the CFLRP. Of these, 24 have treatments in them. Of the 24 watersheds treated, some have multiple entries for example thinning (veg sales/mastication, or thinning/burning, or thinning/burning/weed treatments or thinning/channel treatments/road closures. For the sake of reporting, and taking credit for the work accomplished,

Scoring for National Reporting

Landscape-scale scoring

Few (if any) CFLRP-funded Landscapes propose to meet every proposed desired condition on every acre or achieve landscape-scale objectives through the mechanical treatment of every acre within their landscape boundary. Rather, multiple projects with multiple objectives (fire risk reduction, wildlife habitat improvement, stream restoration, etc.) should facilitate meeting these broader objectives. Scoring at the landscape-scale reflects the degree to which individual Landscapes are moving towards Desired Conditions at broader spatial extent. Landscape-scale scoring is conducted by the multi - party monitoring group at each Landscape.

"Expected progress" will be defined using 10-year benchmarks for FY 2010 projects and 8-year benchmarks for FY 2012 projects for each desired condition based on a percentage of the lifetime outcome specified for the landscape in each proposal. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to Guidance Document for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across [10] % of our CFLRP landscape area.
- **Yellow** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.
- **Red** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.

Ecological Indicator	Green, Yellow, or Red score and % of the landscape across which progress is being made towards desired conditions	Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.
Watershed Condition	Green, 10%	YES

Please briefly describe how you decided on the percentage thresholds used above for the scoring categories and how you calculated your score.

On the Pike and San Isabel, 24 out of 64 total CFLRP watersheds treated (37.5%) progress has been made towards desired conditions. 10% of the 24 treated watersheds moved from non-functional to functional at risk as reported in WCATT. Similar results are expected to be found on the Arapaho Roosevelt NF.

2019 CFLRP Ecological Indicator Progress Report

Project Name: Colorado Front Range-CFLR 004 State: CO

FISH & WILDLIFE HABITAT

Narrative - *Note: All boxes in this template will scroll, so you have as much space as you need.*

☐ If wildlife habitat is not part of your CFLRP proposal and landscape restoration strategy, please let us know by checking this box.
☐ If fish habitat is not part of your CFLRP proposal and landscape restoration strategy, please let us know by checking this box.

1. Did you make any changes to your desired condition(s) for fish & wildlife habitat as compared to the 2014 Ecological Indicator Report? Please briefly describe: **Yes** ☐ **No** ☐

Addressing fish and wildlife habitat more specifically, the original proposal called for the protection and enhancement of old-growth conditions; providing improved and sustainable fish and wildlife habitats; and reducing the potential for high-severity, stand-replacing fires that negatively impact habitats.

2. Did you make any changes to your monitoring methodologies for fish & wildlife habitat as compared to the 2014 Ecological Indicator Report? Please briefly describe: **Yes** ☐ **No** ☐

Common stand exams continue to be the main method for monitoring changes to the specific structural, compositional, and functional components, or key elements of the fish & wildlife habitat affected by management. In addition, the Wildlife Working Team (LRT sub-team) assessed species found in the lower montane ecosystem of the CFLRP and defined Tier 1 and Tier 2 species for monitoring. The team developed recommendations for the methods and the spatial and temporal scales of sampling, and identified a group of songbirds/ woodpeckers, tree squirrels, and a raptor as a focus for monitoring. This group of species represent a comprehensive suite of ecological roles and potential responses to forest restoration. Tree squirrel occupancy surveys utilizing a trail camera-based station method was employed

3. Did you use any new or updated baseline data for evaluating your fish & wildlife habitat progress for the purposes of this report? Please briefly describe: **Yes** ☐ **No** ☐

Songbird point count surveys using the Integrated Monitoring in Bird Conservation Regions (IMBCR) protocol have continued to be performed in untreated areas. The surveys conducted at 1,741 points within 292 grids cells in the untreated areas have contributed to the depth of the baseline data.

4. Did your projects experience any unanticipated developments that positively or negatively affected expected progress towards your desired conditions for fish and wildlife habitat? (e.g. wildfire in the project area, litigation outcome, change in collaborative participation, etc.)

5. What were the most difficult barriers or challenges you experienced in progressing towards your desired conditions for fish and wildlife habitat? If you adapted to address these challenges please provide a brief description of how.

Restoration treatments intend to improve habitat, and it is expected that forest heterogeneity would maintain species diversity, but there is limited empirical study of this. It is important to understand which habitat relationships can explain treatment responses and whether the relationships are consistent with expectations.

6. Did you include the effects of treatments on areas adjacent to the active treatment area? Yes ☐ No ☑
If yes, please briefly describe your methodology for including these adjacent acres, and describe any work conducted across land ownership in support of fish & wildlife habitat.

Desired Conditions

*In this report, the term "**desired conditions**" refers to landscape and resource conditions (as defined collaboratively by stakeholders and land managers) that you are seeking to achieve and maintain for your CFLRP landscape over the next 10+ years. Desired conditions are outcome-driven not output-driven, and should link to your project's CFLRP proposal while being measurable. (Note: The term "desired condition" is used somewhat differently in the Forest Service's Land Management Planning Process. In that context, it is not time bound, and often represents long-term social, economic and ecological goals, while the term "objective" is used to represent specific, measurable and time-bound benchmarks to be achieved while working toward desired conditions in a forest plan area.) In this report, the term "**landscape**" refers to the landscape identified in your CFRLP project proposal or in subsequently-approved proposal edits. See cover page for links to guidance.*

7. Project-scale Desired Conditions Target for Fish & Wildlife Habitat:

100	% change (relative to the desired condition) occurs across	100	% of the project areas by	09/30/2019	
	% change (relative to the desired condition) occurs across		% of the project areas by		*(OPTIONAL. Use if separate, additional target is needed for aquatic habitat)*

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

Canopy height
Ponderosa pine component

Example: 50 miles of inaccessible salmon spawning habitat is made accessible by removing one dam.
Example: Stands have a basal area of 50-80 square feet/acre, which is ideal for red-cockaded woodpecker.
Example: Stands between 5,000-8,000 ft elevation are dominated by ponderosa pine, with 5-10 trees per group, and openings 0.25- 1 acre.

8. Landscape-scale Desired Conditions Target for Fish & Wildlife Habitat:

100	% change (relative to the desired condition) occurs across	7.9	% of the landscape area by	09/30/2019	
	% change (relative to the desired condition) occurs across		% of the landscape area by		*(OPTIONAL. Use if separate, additional target is needed for aquatic habitat)*

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

Extent open canopy - create canopy cover 10-40%.

Example: Slash pine is replaced by longleaf pine ecosystem across 5,000 acres of our CFLRP landscape.
Example: Coniferous forests across the CFLRP landscape have an average canopy cover at or above 50%.
Example: All identified inventoried aquatic organism passages at road/stream crossings that were found to be a barrier (10) are accessible for identified aquatic species at all life stages.

Habitat

9. Please select the categories of the broader goals related to fish & wildlife habitat that you are trying to achieve through your quantifiable desired condition(s):

- ☑ Open forest habitat (e.g. wider tree spacing, less mid-story vegetation)
- ☑ Grass/forb/shrub abundance and/or diversity (e.g. native or desired)
- ☑ Wildlife security (e.g. reduced disturbance and/or mortality to fish or wildlife)
- ☐ Rare or sensitive ecosystem protection and/or restoration (e.g. longleaf, bluestem, riparian, meadow, aspen or wetland habitat)
- ☐ Horizontal Complexity (e.g. "mosaic"/diversity of habitat types, patch sizes, and/or patterns)
- ☐ Vertical complexity (e.g. number of canopy layers)
- ☐ Forest structures (e.g. snags, downed wood, den trees)
- ☐ Mast-producing plant abundance and/or diversity (e.g. acorns, nuts, fruits, or berries eaten by wildlife)
- ☐ Sustainable flow of habitat age-classes through time (e.g. planning the proportion of early-, mid-, and late-seral stands)
- ☐ Habitat connectivity/availability (e.g. increased access to or availability of desired habitat)
- ☐ Aquatic habitat connectivity (e.g. culverts are passable to all aquatic organisms, no dams, stream diversions)
- ☐ Aquatic habitat complexity (e.g. downed wood, pools, riffles, etc)
- ☐ Aquatic sedimentation levels (e.g. suspended sediment or fine sediment in spawning gravels)
- ☐ Other. Please describe:

10. Please state the evaluation metric(s) you are using to monitor progress towards your desired conditions for fish & wildlife habitat for this report. Note: This evaluation metric is something you are measuring or counting to monitor habitat change. It has a unit of measurement attached to it.

Protection and enhancement of old-growth conditions: openings, snags, coarse woody debris, groups/clumps of trees, large and old trees (both live and dead; occurring as both individuals and groups).

Providing improved and sustainable fish and wildlife habitats: a mosaic of vegetation composition, structural stage, and age classes at various scales (project- and landscape-level).

Reducing the potential for high-severity stand-replacing fires that negatively impact habitats: reduced risk of large-scale land disturbances that

Examples of habitat evaluation metrcs: basal area in square feet per acre (for tree density), number of trees per acre (for tree density), quadratic mean diameter in inches (for tree sizes), litter and duff depths in centimeters (for fire hazard), percent canopy cover (for opennesss), percent ground cover (for forage), seedling survival per acre per year (for reforestation), number of woody debris pieces in a specific size class per stream mile (for fish habitat), grass dry weight clippings used to calculate grass pounds per acre (for forage abundance)

Populations

11. Please select the categories of broader goals related to fish & wildlife populations that you are trying to achieve through your quantifiable desired condition(s). Then list the specific species of interest related to each category you select.

- ☐ Maintain abundance/density:
- ☐ Increase abundance/density:
- ☐ Decrease abundance/density:
- ☐ Maintain native species diversity:
- ☐ Increase native species diversity:
- ☐ Translocation/reintroduction:
- ☐ Optimal sustained yield of game species:
- ☐ Ecosystem function/food webs:
- ☐ Spatial extent of population:
- ☐ Other. Please describe:

12. If relevant for your CFLRP project, please state the evaluation metric(s) you are using to monitor progress towards your desired conditions for fish & wildlife populations. Note: This evaluation metric is something you are measuring or counting to monitor population change. It has a unit of measurement attached to it.

Examples of population evaluation metrics: number of wildlife encounter events per unit area via point counts or remote cameras (for wildlife usage), number of pellet groups along transects used to calculate animal density per unit area (for mammal usage), presence/absence of a plant community-associated wildlife species in the project area, presence of aquatic species as indicated by eDNA

☐ Please check this box if you are not evaluating fish & wildlife populations.

Data and Methodology

13. Select the type(s) of monitoring you used to assess Project-scale (P) and Landscape-scale (L) progress towards fish & wildlife habitat desired conditions for this report. Select all that apply.

P	L	
☐	☐	**Baseline Data Collection** (i.e. was data collected prior to treatment to be used for later comparison?)
☐	☐	**Accomplishment Reporting** (i.e. was progress tracked using acres and miles reported?)
☐	☐	**Implementation Monitoring** (i.e. were the treatments implemented as prescribed?)
☐	☐	**Effectiveness Monitoring Pilot Study** (i.e. was a trial run conducted to assess considerations of crafting an effectiveness monitoring plan?)
☐	☐	**Effectiveness Monitoring** (i.e. were treatments effective at meeting the stated objectives?)
☐	☐	**Ecological Impacts Monitoring** (i.e. were there any unforeseen ecological consequences that could compromise treatment success?)
☐	☐	**Other.** Please describe:

14. Select the methodologies used to assess Project-scale (P) and Landscape-scale (L) progress towards fish & wildlife habitat desired conditions for this report. Select all that apply and provide a brief description for each:

P	L	
☐	☐	Common Stand Exams (USFS procedures):
☐	☐	Understory vegetation plots or transects:
☐	☐	Fish or Wildlife occupancy/use surveys:
☐	☐	Stream surveys:
☐	☐	Remote motion-capture cameras:
☐	☐	Ground-based photo points or photo plots:
☐	☐	Aerial surveys, aerial photography, or remote sensing:
☐	☐	Treatments implemented (e.g. acres or miles accomplished):
☐	☐	Modeling (include type and whether ground-truthed):
☐	☐	GIS analysis:
☐	☐	Other:

15. Where is the the data that is being used for monitoring Project-scale (P) and Landscape-scale (L) progress toward fish & wildlife habitat desired conditions being stored? Select the database categories that apply and provide a description of the specific datasets being used. Include links if available:

P	L	
☐	☐	GIS database:
☐	☐	County database:
☐	☐	State database:
☐	☐	Tribal database:
☐	☐	Citizen Science database:
☐	☐	FSVeg:
☐	☐	NRIS:
☐	☐	Other USFS database of record: *please select performance measure from the table below*
☐	☐	Other:

Performance Measure Shorthand	Description	Database	P	L
BIO-NRG	Green tons from small diameter and low value trees removed from NFS lands and made available for bio-energy production	TIM	☐	☐
FOR-VEG-EST	Acres of forest vegetation established	FACTS	☐	☐
FOR-VEG-IMP	Acres of forestland vegetation improved	FACTS	☐	☐
FP-FUELS-NON-WUI	Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildand fire	FACTS	☐	☐
FP-FUELS-WUI	Acres wildland/urban interface (WUI) high-priority hazardous fuels treated to reduce the risk of catastrophic wildland fire	FACTS	☐	☐
HBT-ENH-LAK	Acres of lake habitat restored or enhanced	WIT	☑	☑
HBT-ENH-STRM	Miles of stream habitat restored or enhanced	WIT	☑	☑
HBT-ENH-TERR	Acres of terrestrial habitat restored or enhanced	WIT	☑	☑
INVPLT-NXWD-FED-AC	Highest priority acres treated annually for noxious weeds and invasive plants on NFS lands	FACTS	☐	☐
INVSPE-TERR-FED-AC	Highest priority acres treated for invasive terrestrial & aquatic species on NFS lands	FACTS	☐	☐
RD-DECOM-NON-SYS	Miles of road decommissioned (non-system)	WIT	☐	☐
RD-DECOM-SYS	Miles of road decommissioned (system)	ROADS	☐	☐
RD-HC-IMP	Miles of high clearance system roads improved	ROADS	☐	☐

Performance Measure Shorthand	Description	Database	P	L
RD-HC-MAIN	Miles of high clearance system roads receiving maintenance	ROADS	☐	☐
RD-PC-IMP	Miles of road reconstruction and capital improvement	ROADS	☐	☐
RD-PC-MAIN	Miles of system roads receiving maintenance	ROADS	☐	☐
RG-VEG-IMP	Acres of rangeland vegetation improved	FACTS	☐	☐
S&W-RSRC-IMP	Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions	WIT	☐	☐
SP-NATIVE-FED-AC	Number of priority acres treated annually for native pests on Federal lands	FAD	☐	☐
STRM-CROS-MITG-STD	Number of stream crossings constructed or reconstructed to provide for aquatic organism passage	WIT	☐	☐
TL-IMP-STD	Miles of system trail improved	TRAILS	☐	☐
TL-MAINT-STD	Miles of system trail maintained	TRAILS	☐	☐
TMBR-SALES-TRT-AC	Acres of forestlands treated using timber sales	FACTS	☐	☐
TMBR-TRT	Acres of forestlands treated to achieve healthier conditions	FACTS	☐	☐
Other:			☐	☐
Other:			☐	☐

16. Please describe why the datasets or performance measures you selected in Question 15 above are <u>appropriate for assessing progress</u> towards your fish & wildlife habitat desired condition(s).

Project-scale scoring

From the beginning, CFLRP intended to shift towards desired conditions at the landscape-scale. As the disturbances and processes of interest occur at a landscape-scale, we need a landscape-scale assessment. It's a challenge to look at the impacts at that scale, given the scale itself as well as time delays (e.g. it takes more time to shift outcomes at landscape-scale than project-scale). While landscape-scale is the focus, project-scale assessments allow projects to bring in their monitoring data and look at treatment outcomes.

Each management action funded through CFLRP will have its own project-level objectives that are designed to contribute to achieving desired conditions at larger scales. Project-scale scoring should reflect how well the results of an individual management activity met the objectives for that project. Individual projects may not meet every desired condition of the CFLRP project. Project-scale scoring is conducted by the multi-party monitoring group following completed management activities.

An individual activity might not need to lead to a fully restored acre, but if it sets the landscape up for the next treatment it may still get a good rating. For example if a successful thinning doesn't restore a fire regime, but it sets up landscape for subsequent burns that might, it could still receive a "Green" rating. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to Guidance Document for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across 75% or more of our CFLRP project areas.
- **Yellow** = Expected progress is being made towards desired conditions across 26% - 74% of our CFLRP project areas.
- **Red** = Expected progress is being made towards desired conditions across 25% or less of our CFLRP project areas.

Ecological Indicator	Green, Yellow, or Red score and % of the CFLRP project areas resulting in measurable progress as defined above	Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.
Fish and Wildlife Habitat	Green 75%	YES

Please briefly describe how you calculated your score.

The results of the bird monitoring performed under the Integrated Monitoring in Bird Conservation Regions (IMBCR) protocol demonstrates that bird species varied in how they were distributed with respect to treatments at a fine spatial scale. Both positive and negative relationships were observed as species were distributed unevenly between treated and untreated areas depending on time since treatment. However, while diversity at treated areas varied little from

Scoring for National Reporting

Landscape-scale scoring

Few (if any) CFLRP-funded Landscapes propose to meet every proposed desired condition on every acre or achieve landscape-scale objectives through the mechanical treatment of every acre within their landscape boundary. Rather, multiple projects with multiple objectives (fire risk reduction, wildlife habitat improvement, stream restoration, etc.) should facilitate meeting these broader objectives. Scoring at the landscape-scale reflects the degree to which individual Landscapes are moving towards Desired Conditions at broader spatial extent. Landscape-scale scoring is conducted by the multi -party monitoring group at each Landscape.

"Expected progress" will be defined using 10-year benchmarks for FY 2010 projects and 8-year benchmarks for FY 2012 projects for each desired condition based on a percentage of the lifetime outcome specified for the landscape in each proposal. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to Guidance Document for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across [10] % of our CFLRP landscape area.
- **Yellow** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.
- **Red** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.

Ecological Indicator	Green, Yellow, or Red score and % of the landscape across which progress is being made towards desired conditions	Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.
Fish and Wildlife Habitat	Red 10%	YES

Please briefly describe how you decided on the percentage thresholds used above for the scoring categories and how you calculated your score.

Treatments increase heterogeneity, which can accommodate a greater range of species with different life histories, and therefore generally benefit wildlife communities. The results of the bird monitoring performed under the Integrated Monitoring in Bird Conservation Regions (IMBCR) protocol demonstrates that treatments have promoted habitat conditions that support open forest species without eliminating habitat for closed species, thereby increasing species richness across the landscape. However, monitoring results also suggest that mean species richness would peak when around 60 percent of the landscape is treated.

2019 CFLRP Ecological Indicator Progress Report

Project Name: Colorado Front Range State: CO

INVASIVE SPECIES

Narrative - *Note: All boxes in this template will scroll, so you have as much space as you need*

☐ If invasive species is not part of your CFLRP proposal and landscape restoration strategy, please let us know by checking this box.

1. Did you make any changes to your desired condition(s) for invasive species as compared to the 2014 Ecological Indicator Report? Please briefly describe: **Yes** ☐ **No** ☐

At the time of the initiation of this project, there was very little information available on the presence and distribution of invasive species within the project areas. Since that time, there have been several surveys for noxious weeds across the area. As a result, there are now better ideas of how to deal with invasive plants in the area. The intent will be to reduce the numbers of sites infested by weedy species, and have an over-all reduction in the area covered by them.

2. Did you make any changes to your monitoring methodologies for invasive species as compared to the 2014 Ecological Indicator Report? Please briefly describe: **Yes** ☐ **No** ☐

There was little, if any, monitoring or inventory of invasive species in the initial methodology for these projects. The understory vegetation analysis is inadequate to identify weed populations in the landscape context. Now that there is available information on the status and distribution of invasive species, methods of monitoring will be changing to more adequately address weeds. Specific surveys for plants on the Colorado Noxious Weeds lists are being conducted. Other potentially invasive species, including some natives, will be addressed as necessary. Species and populations being prioritized for treatment. Areas to be targeted for weed surveys prioritize points of entry, travel routes, landings,

3. Did you use any new or updated baseline data for evaluating your invasive species progress for the purposes of this report? Please briefly describe: **Yes** ☐ **No** ☐

Several surveys for Colorado Noxious Weeds have been conducted and are continuing, although not necessarily tied to these projects. Earlier records of noxious weeds have been gathered and are now in a more useful condition. Some populations have been treated.

4. Did your projects experience any unanticipated developments that positively or negatively affected expected progress towards your desired conditions for invasive species? (e.g. wildfire in the project area, litigation outcome, change in collaborative participation, etc.)

5. What were the most difficult barriers or challenges you experienced in progressing towards your desired conditions for invasive species? If you adapted to address these challenges please provide a brief description of how.

The lack of any formal or regular inventory of invasive species provided no baseline for comparison for treatments and their effectiveness.

Desired Conditions

*In this report, the term "**desired conditions**" refers to landscape and resource conditions (as defined collaboratively by stakeholders and land managers) that you are seeking to achieve and maintain for your CFLRP landscape over the next 10+ years. Desired conditions are outcome-driven not output-driven, and should link to your project's CFLRP proposal while being measurable. (Note: The term "desired condition" is used somewhat differently in the Forest Service's Land Management Planning Process. In that context, it is not time bound, and often represents long-term social, economic and ecological goals, while the term "objective" is used to represent specific, measurable and time-bound benchmarks to be achieved while working toward desired conditions in a forest plan area.) In this report, the term "**landscape**" refers to the landscape identified in your CFRLP project proposal or in subsequently-approved proposal edits. See cover page for links to guidance.*

6. Project-scale Desired Conditions Target for Invasive Species

100	% change (relative to the desired condition) occurs across	100	% of the project areas by	09/30/2019
	% change (relative to the desired condition) occurs across		% of the project areas by	

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

Maintaining or decreasing the occurrence and cover of invasive plant species

Example: Cogongrass is reduced to less than 25% cover.
Example: Using the prevention protocols on all projects, no new invasive species infestations are established.

7. Landscape-scale Desired Conditions Target for Invasive Species:

100	% change (relative to the desired condition) occurs across	7.9	% of the landscape area by	09/30/2019
	% change (relative to the desired condition) occurs across		% of the landscape area by	

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

Example: The increase in coverage of Leafy Spurge and Rush Skeletonweed is prevented on 500 acres of sensitive botanical habitat within our CFLRP landscape.
Example: All known populations of Yellow Star Thistle are contained along 100 miles of FS roads and trails within our CFLRP landscape.
Example: The presence of feral swine is surveyed and mapped on 500 acres within our CFLRP landscape.

8. Please select the categories of the broader goals related to invasive species that you are trying to achieve through your quantifiable desired condition(s):

- ☑ Inventory and Mapping
- ☐ Risk Assessment
- ☐ Prevention
- ☐ Maintenance at current levels
- ☐ Containment below thresholds
- ☑ Reduction
- ☑ Eradication
- ☐ Increased resilience. Recognizing *invasive species are not constrained to disturbed areas*, please describe your definition of resilience in an invasive species context:
- ☐ Other. Please describe:

9. For each invasive species you have addressed within your CFRLP landscape, please list the action(s)[1] you have taken to work towards your invasive species desired conditions, the acres and/or miles you have accomplished, and the efficacy of each action*:*
(All of the following data is reported in FACTS.)

Target Invasive Species	Action Taken	Land Ownership	Acres	Efficacy (%)

[1] Actions taken to address an invasive species might include inventory & mapping, hand removal, mechanical removal, release of a biological control agent (an organism that kills the target species), ground-based herbicide application, aerial herbicide application, tarping, grazing, preventative weed wash stations, trapping invasive animals, etc.

10. Please briefly describe the specific negative impacts each of your target invasive species causes that you are trying to avoid.
These impacts can be environmental, economic, cultural, or human/animal health-related.

Cheat grass can make sites more prone to fire.
Other species compete for space and nutrients with native understory species of the local ponderosa pine woodlands.
Some species may prevent the germination and/or establishment of native species.

Data and Methodology

11. Select the methodologies used to assess Project-scale (P) and Landscape-scale (L) progress towards invasive species desired conditions for this report. Select all that apply and provide a brief description of each:

P	L	
☐	☐	Aerial surveys/inventories/mapping:
☑	☑	Ground surveys/inventories/mapping: or Colorado A, B, and C noxious weed lists at points of entry, along travel routes, and on landings
☐	☐	Environmental sampling (wood, soil, water, infected tissue, etc.):
☐	☐	Observations of individuals:
☐	☐	Observations of damage:
☐	☐	Observation of tracks, scat, nests, etc.:
☐	☐	Trap samples:
☐	☐	eDNA:
☑	☑	Other: Adequate methods for inventory and monitoring for weeds within the project areas is lacking.

12. Where is the the data that is being used for monitoring Project-scale (P) and Landscape-scale (L) progress toward invasive species desired conditions being stored? Select the databases categories that apply and provide a description of the specific datasets being used. Include links if available:

P	L	
☑	☑	GIS database:
☐	☐	County database:
☐	☐	State database:
☐	☐	Tribal database:
☐	☐	Citizen Science database:
☐	☐	Forest Inventory and Analysis (FIA) database:
☐	☐	USFS database of record (FACTS - *select performance measures*):
		☐ INVPLT-NXWD-FED-AC Highest priority acres treated for noxious weeds and invasive pests ☐ INVSPE-TERR-FED-AC Highest priority acres treated for invasive terrestrial & aquatic species
☐	☐	Other:

Project-scale scoring

From the beginning, CFLRP intended to shift towards desired conditions at the landscape-scale. As the disturbances and processes of interest occur at a landscape-scale, we need a landscape-scale assessment. It's a challenge to look at the impacts at that scale, given the scale itself as well as time delays (e.g. it takes more time to shift outcomes at landscape-scale than project-scale). While landscape-scale is the focus, project-scale assessments allow projects to bring in their monitoring data and look at treatment outcomes.

Each management action funded through CFLRP will have its own project-level objectives that are designed to contribute to achieving desired conditions at larger scales. Project-scale scoring should reflect how well the results of an individual management activity met the objectives for that project. Individual projects may not meet every desired condition of the CFLRP project. Project-scale scoring is conducted by the multi-party monitoring group following completed management activities.

An individual activity might not need to lead to a fully restored acre, but if it sets the landscape up for the next treatment it may still get a good rating. For example if a successful thinning doesn't restore a fire regime, but it sets up landscape for subsequent burns that might, it could still receive a "Green" rating. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to Guidance Document for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across 75% or more of our CFLRP project areas.
- **Yellow** = Expected progress is being made towards desired conditions across 26% - 74% of our CFLRP project areas.
- **Red** = Expected progress is being made towards desired conditions across 25% or less of our CFLRP project areas.

Ecological Indicator	Green, Yellow, or Red score and % of the CFLRP project areas resulting in measurable progress as defined above	Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.
Invasive Species	Yellow	Little progress has been made due to the lack of baseline information.

Please briefly describe how you calculated your score.

At the outset, there was little if any available information on invasive species in the area. Now that some limited information is available, there is greater opportunity for treatment of invasive species.

Scoring for National Reporting

Landscape-scale scoring

Few (if any) CFLRP-funded Landscapes propose to meet every proposed desired condition on every acre or achieve landscape-scale objectives through the mechanical treatment of every acre within their landscape boundary. Rather, multiple projects with multiple objectives (fire risk reduction, wildlife habitat improvement, stream restoration, etc.) should facilitate meeting these broader objectives. Scoring at the landscape-scale reflects the degree to which individual Landscapes are moving towards Desired Conditions at broader spatial extent. Landscape-scale scoring is conducted by the multi -party monitoring group at each Landscape.

"Expected progress" will be defined using 10-year benchmarks for FY 2010 projects and 8-year benchmarks for FY 2012 projects for each desired condition based on a percentage of the lifetime outcome specified for the landscape in each proposal. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to Guidance Document for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.
- **Yellow** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.
- **Red** = Expected progress is being made towards desired conditions across [ ] % of our CFLRP landscape area.

Ecological Indicator	Green, Yellow, or Red score and % of the landscape across which progress is being made towards desired conditions	Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.
Invasive Species	Red	No. As activities are being implemented, areas are having invasive species ap

Please briefly describe how you decided on the percentage thresholds used above for the scoring categories and how you calculated your score.

5 of 6 treatments exhibited an increase in noxious weeds for the treatment vs control site. In other words, 83.3 percent of treatment areas showed increases of non-native species.
HR 7 had 2 new species of invasives, where there were previously only 2; total of 4
EV13 had no invasives, either in the control or the treatment area
EV28 had 2 new species of invasives, where there had been only one before treatment; total of 3

Monitoring References and Resources

1. Briefly describe any key lessons learned about integration across these 4 ecological sub-indicators.
For example, if you planned fuels reduction treatments (Fire Regime) strategically around a Priority Watershed (Watershed Condition).

The two primary drivers for determining the desired conditions and location of forest restoration treatments at the landscape-scale were: 1) minimizing the potential for post-fire erosion and sediment delivery to water bodies in "zones of concern" for water providers; and 2) reducing crown fire potential and increasing surface fire potential in proximity to wildland-urban interface housing developments. The water provider

2. Briefly describe the roles of the parties involved in setting the desired conditions, and collecting, assessing, and sharing the data used in this report:

The desired conditions and much of the data used in this report were products of the multi-stakeholder collaborative monitoring program that operated throughout the 2010-19 Colorado Front Range CFLRP. This collaborative monitoring program emerged and was managed by the multi-stakeholder LR Team. The initial monitoring plan was crafted in Spring 2011. Desired conditions, indicators, monitoring metrics and

3. Please acknowledge the people who assisted with completing this 2019 CFLRP Ecological Indicator Report:

Tony Cheng, CFRI
Angela Safranek, USFS

4. Please provide links to your past CFLRP monitoring reports developed by the USFS, partners, etc.:

Examples: Uncompahgre CFLRP Monitoring of Forest Spatial Patterns; Four Forest Restoration Initiative Bird Survey Report 2015

5. Please provide links to your CFLRP monitoring plans and any approved revisions (or include as an attachment):

https://cfri.colostate.edu/wp-content/uploads/sites/22/2018/10/2017_FR_CFLRP_Monitoring_Plan_Typeset_2018.pdf

Examples: Colorado Front Range Multi-Party Monitoring Plan; Dinkey Landscape Ecological Monitoring Plan

6. Please provide links to technical reports or other literature utilized in determining and assessing the desired conditions used in this report:

Examples: Historical Forest Attributes of the Western Blue Mountains of Oregon; Restoring Ponderosa Pine Forests of the Colorado Front Range