

Guidance: Tracking and Reporting Ecological Outcomes of the Collaborative Forest Landscape Restoration Act

Background

The national indicators that form the basis of the 5-Year Report to Congress on the Collaborative Forest Landscape Restoration Program (CFLRP) were developed in 2011 through a workshop with Forest Service (FS) staff and partner representatives from each of the first ten CFLRP projects. The workshop was facilitated by the National Forest Foundation, with support from the FS Washington Office (WO) Forest Management staff. The purpose of the workshop was to identify national-level outcomes and indicators that could be used to “roll up” data to effectively communicate to Congress and other national audiences the comprehensive impact of the CFLRP. The workshop participants collaborated to develop indicators that would be simple, affordable, responsive to the direction of the Act, and supported as much as possible by existing sources of data. Participants also stressed that the indicators should maximize individual CFLRP project autonomy and minimize additional reporting requirements.

The workshop resulted in **five national indicators – ecological outcomes, economic impact, fire risk and costs, leveraged funds, and collaboration** – designed to fulfill the purposes of the Act. In subsequent months, the National Forest Foundation gathered input, responses, and suggestions regarding the draft indicators, and used the input to compile a revised set of draft indicators. Forest Management staff then worked to review and integrate the indicators into reporting templates.

Each CFLRP project reported on progress towards meeting their desired conditions for these national indicators in FY2014 (5 years in) and will report again in FY19 (ten years in) and FY2024 (15 years in). All of the FY14 Ecological Indicator Reports are available on the CFLRP website here (scroll down): <https://www.fs.fed.us/restoration/CFLRP/results.shtml>

Goal

The goal of the ecological indicator report is to assess the ecological outcomes of CFLRP projects funded under the Collaborative Forest Restoration Act of 2009 in a way that is relevant to each individual collaborative group and its specific desired conditions, while also allowing for a national summary. The ecological indicator report is *not* intended to capture all of the monitoring work completed within a CFLRP project. Rather, it is intended to provide a better understanding of the extent to which the CFLRP project is progressing towards the desired ecological conditions outlined in its proposal. It is intended as a way to approach evaluation

from a learning perspective, providing space to learn from what has worked well and what didn't turn out as expected.

Challenge

CFLRP provides support to landscape-scale restoration through collaboration with a diverse sets of stakeholders that occur across a number of different ecosystems throughout the United States. This diversity is reflected in the variety of ecological objectives that each collaborative has chosen to address within their respective proposals. This situation makes it unlikely that any single metric or index value will be sufficient for describing the ecological impacts of the Act. An approach is needed that reflects the values and ecological restoration objectives of each collaborative while maintaining the ability to provide a national summary of the Act's impacts. In addition, this approach should provide a simple and transparent method of accounting for each collaborative's activities, the objectives of those activities, and the resulting responses on the landscape throughout the 10-year CFLRP funding period and the 15-year CFLRP monitoring period.

Changes since FY2014

After FY14 reporting, the FS WO CFLRP staff reviewed the FY14 process to determine what had worked well and what needed to change. They did this by soliciting perspectives, experiences, and expertise from project practitioners and partners, as well as from the FS Regional Offices and FS Washington Office.

For FY19, the changes made in the ecological indicator report reflect the need to better capture the context of developing and evaluating progress towards desired conditions. The FY14 ecological indicator report template *did not* ask for information about methodologies, evaluation metrics, ecological and social context, etc. This information is critical to understanding the final scores each CFLRP project assigns to itself within each of the ecological indicator categories.

Looking to the future, there is interest in providing more consistency across CFLRP projects for reporting – while recognizing the inherent diversity of their social, economic, and ecological contexts. Additional consistency would provide a framework for monitoring and the ability to summarize and tell a broader story. The ecological indicator reporting process continues to provide valuable learning for the CFLRP projects, and beyond, while seeking improvement and progress over time.

Developing Desired Conditions

All of the CFLRP projects identified ecological goals in their initial proposals. In order to understand and evaluate progress towards these goals, this reporting structure asks each CFLRP project and its stakeholders to identify quantifiable targets that management must achieve to realize these goals. These desired condition targets should be based on the desired outcomes from the initial proposals to determine whether management is meeting expectations. These desired condition targets should also be feasible to monitor over the course of five, ten, and fifteen years.

Well-developed desired conditions targets based on CFLRP project proposals will lead to an understanding of the specific treatments that should be implemented to move from the current conditions to the desired conditions, as well as the specific monitoring that can measure progress from the current conditions to the desired conditions. In this way, the CFLRP Ecological Indicator Report responses can effectively align desired outcomes with progress towards those outcomes.

*Most CFLRP projects developed desired condition targets for the FY14 Ecological Indicator Report process. **While recognizing the value of continuity and the ability to see trends over time, if your project has changed your desired conditions, please use the “Narrative” sections of the FY19 ecological indicator report template to indicate if/how that has changed over the last five years of project implementation.***

Desired condition targets are framed in the following format:

Desired Conditions Target for Fire Regime:

___% change (relative to the desired conditions) occurs across ___% of the **landscape area** by ___ date.

___% change (relative to the desired conditions) occurs across ___% of the **project areas** by ___ date.

Desired Conditions Target for Watershed Condition:

___% change (relative to the desired conditions) occurs across ___% of the **landscape area** by ___ date.

___% change (relative to the desired conditions) occurs across ___% of the **project areas** by ___ date.

Desired Conditions Target for Fish and Wildlife Habitat:

___% change (relative to the desired conditions) occurs across ___% of the **landscape area** by ___ date.

___% change (relative to the desired conditions) occurs across ___% of the **project areas** by ___ date.

Desired Conditions Target for Invasive Species:

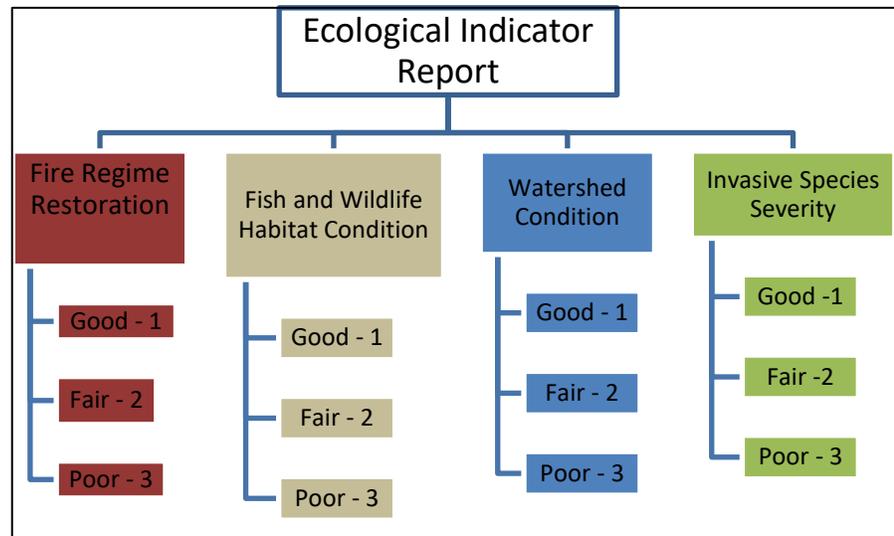
___% change (relative to the desired conditions) occurs across ___% of the **landscape area** by ___ date.

___% change (relative to the desired conditions) occurs across ___% of the **project areas** by ___ date.

Ecological Indicators

Each CFLRP project has four categories of ecological indicators (or “sub-indicators”) (Figure 1) that are evaluated based on progress towards desired conditions. This maintains each CFLRP project’s ability to be evaluated on the basis of its own unique objectives while providing a set of metrics that tiers

Figure 1. Conceptual diagram of the four components of the CFLRP Ecological Outcome Measure. Each component is reported individually.



directly to the Act and the proposals that were submitted for funding under the Act. Progress towards each desired condition is evaluated based on the standardized scoring system (described below). Scores are assigned at the **landscape-scale** (as defined by the CFLR proposal) and the **project-scale** (referring to individual NEPA planning treatment units) to allow CFLRP projects to report on both short-term and long-term progress, while recognizing that landscape-scale outcomes are the intended outcomes from the CFLRP.

Within each ecological indicator category, there may be multiple desired conditions. The scores for multiple desired conditions should be averaged to provide a summary of progress within that ecological indicator. You may choose to use a weighted average, if appropriate (*see example in the next section below*).

This information, in conjunction with the CFLRP Annual Reports, will help provide both the outputs (as summarized by the performance measures, i.e. the number of acres and miles treated) and the outcomes (as summarized by the scores, i.e. “green”, “yellow”, or “red” scores for the ecological indicators) for the purpose of national reporting.

Averaging multiple Desired Conditions: Example

CFLRP projects have the flexibility to assign uneven weights to the desired conditions they identify at both the project and landscape scale. For example, if a project has one Fish & Wildlife Habitat desired condition statement concerning habitat access and one concerning culvert improvements, the collaborative may choose to:

- Weigh the two desired conditions *evenly*: e.g. if the project is meeting 80% of the habitat goals and 100% of the culvert goals, the overall score would be 90% if they weighted these two statements the same. Calculation: $(80+100)/2 = 90$
- Weigh the desired conditions *unevenly*: In the above example, a 2 to 1 (habitat to culvert) weighted average would bring the score to 86.7%. Calculation: $[(2*80)+(1*100)]/3 = 86.7$

Glossary of Key Terms for Ecological Indicators

CFLRP Landscape – Sometimes referred to as a CFLR Landscape, Landscape, CFLRP Project, or CFLR Project. Includes the entire project boundary area approved for funding under the Collaborative Forest Landscape Restoration Act.

Project-level- For the purpose of this document, project-level will refer to NEPA planning areas or implementation areas.

Treatment Area – Individual management units with the CFLR Landscape. Where “project-level” monitoring occurs.

Desired Condition – 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 restoration strategy 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.)*

Desired Condition Statement(s) –Landscape and resource conditions as defined collaboratively by stakeholders and land managers to achieve and maintain over time for each CFLR Landscape. Desired conditions are outcome-, not output-driven and should encompass 10+-years.

Indicator – an ecological outcome variable that can be assessed through different metrics; e.g. fire regime restoration.

Landscape-level – For the purpose of this document, landscape-level will refer to the entire project boundary area approved for funding under the Collaborative Forest Landscape Restoration Act.

Metric – a quantifiable variable used to assess indicators. Metrics need to be measurable in a repeatable way through time, with defined desired conditions or objectives.

Ecological Outcome Measures 1: Fire Regime Restoration

From the Act: *...a collaborative forest landscape restoration proposal shall-- describe plans to—*

(A) reduce the risk of uncharacteristic wildfire, including through the use of fire for ecological restoration and maintenance and reestablishing natural fire regimes, where appropriate;

Description and Justification

CFLRP Landscapes were funded to implement forest restoration treatments to facilitate the reduction of wildfire management costs, including through reestablishing natural fire regimes, and reducing the risk of uncharacteristic wildfire. In frequent-fire landscapes, restoration treatments may also reduce the risk of high severity fire and comport with goals to reduce risk to communities and high resource values. Desired Conditions under this indicator should identify objectives for restoring fire behavior characteristics and/or forest structure important to fire behavior within the natural range of variability for each landscape.

Guidance on Specifying Desired Conditions for Use in National Reporting

- Desired Conditions should be quantifiable.
- Desired Conditions related to NRV should identify which components of NRV they are addressing.
- The Desired Conditions statement should clearly identify the metric that will be used to determine its status (i.e., changes in Fire Regime Condition Class vs. changes in modeled fire behavior).
- At the landscape scale, Desired Conditions should, where appropriate, utilize LANDFIRE data to ensure consistency with other national reporting efforts.
- If more specific or other finer resolution (<30m) data is available, landscapes should use those other national or local data sources and cite their source.
- The spatial scale (e.g., treatment, landscape, etc.) of the Desired Conditions should be explicitly identified.
- The temporal scale (e.g., FY, 3 year, 5 year, etc.) of the Desired Conditions should be explicitly identified.

Scoring for National Reporting

Landscape-scale scoring

Few (if any) CFLRP-funded Landscapes propose to achieve landscape scale objectives through the mechanical treatment of every acre within their landscape boundary. Rather, the use of strategically placed restoration treatments should facilitate meeting these broader objectives. Scoring at this level reflects the degree to which individual Landscapes are resulting in Desired Conditions at broader spatial extents.

- Good = Expected progress is being made towards Desired Conditions across____% of the CFLR Landscape area.

- Fair = Expected progress is being made towards Desired Conditions across ____% of the CFLR Landscape area
- Poor = Expected progress is being made towards Desired Conditions across ____% of the CFLR Landscape area

“Expected progress” will be defined using 3, 5, 7 and 10-year benchmarks for each Desired Condition based on a percentage of the 10-year outcome specified in each Landscape’s proposal. To meet national reporting requirements on the Act, the 5, 10 and an additional 15-year reporting outcome are needed.

Project-scale scoring

Each management action funded through the 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 activity. As such project-scale scoring is conducted following completed management activities by the multi-party monitoring group at each Landscape.

- Good = 75% or more of implemented treatments result in measurable progress towards individual project-level Desired Conditions.
- Fair = 26% - 74% of implemented treatments result in measurable progress towards individual project-level Desired Conditions.
- Poor = 25% or less of implemented treatments result in in measurable progress towards individual project-level Desired Conditions.

Ecological Outcome Measure 2: Fish and Wildlife Habitat Condition

From the Act: ...a collaborative forest landscape restoration proposal shall-- describe plans to—

(B) improve fish and wildlife habitat, including for endangered, threatened, and sensitive species;

Description and Justification

Alteration of forest structure through restoration treatments is likely to impact wildlife habitat through a variety of complex pathways. At larger scales this is likely to occur through changes in the size and arrangement of the various vegetation communities that comprise habitat for various species. At finer scales this is likely to occur through changes in stand structure, composition, and arrangement of key habitat elements for a particular species. **For this indicator, CFLR Landscapes are encouraged to focus on habitat for a variety of species; however, in some instances National Forest Land Management Plans, the Endangered Species Act, or Stakeholder consensus may identify a suite of species whose habitat requirements are often of concern when implementing restoration treatments.** Desired Conditions within this Indicator should identify the species or suites of species presumed to be associated with the habitat in question, clearly articulate the structural and compositional components of those habitats, and/or identify key elements (e.g., snags, coarse woody debris, large-diameter trees, etc.) that should be present within those habitats.

Guidance on Specifying Desired Conditions for Use in National Reporting

- Desired Condition statements should be quantifiable and capable of being evaluated against monitoring data (multiparty or otherwise).
- The spatial scale (e.g., project, landscape, etc.) of the Desired Conditions should be explicitly identified.
- The temporal scale (e.g., FY, 3 year, 5 year, etc.) of the Desired Conditions should be explicitly identified.
- At the landscape scale, Desired Conditions for “habitat type” should, where appropriate, utilize LANDFIRE Biophysical Setting (BpS) or USFS Land-type Association (LTA) data to ensure consistency with other national reporting efforts
- If more specific (e.g., remotely sensed information on forest structural attributes) or other finer resolution (<30m) data is available, landscapes should use those other national or local data sources and cite their source.
- Desired Condition statements should identify the habitat predicted to be associated with a specific suite of species for effectiveness monitoring.
- Project-scale Desired Conditions should identify the specific structural components (e.g., basal area, canopy cover, etc.), compositional components (e.g., proportion of various life forms, diameter distribution, etc.), functional components (e.g. ...), or key elements (e.g., snags, coarse woody debris, large-diameter trees, etc) of the habitat that management will be affecting, and select a quantifiable range of desired outcomes.
- Diversity and richness characterizations can be extremely difficult and costly. Desired Conditions related to diversity and richness of either species or habitats should explicitly state the method of assessment (e.g. Shannon-Weaver H' , inverse Simpson's C , Bray-Curtis, Jackknife 2, etc.).

Scoring for National Reporting

Landscape-scale scoring

- Good = Expected progress is being made towards Desired Conditions across ____% of the CFLR landscape area.
- Fair = Expected progress is being made towards Desired Conditions across ____% of the CFLR landscape area
- Poor = Expected progress is being made towards Desired Conditions across ____% of the CFLR landscape area

“Expected progress” will be defined using 3, 5, 7 and 10-year benchmarks for each Desired Condition based on a percentage of the 10-year outcome specified in each Landscape’s proposal. To meet national reporting requirements on the Act, the 5, 10 and an additional 15-year reporting outcome are needed.

Project-scale scoring

- Good = 75% or more of implemented treatments result in measurable progress towards individual project-level Desired Conditions

- Fair = 26%-74% of implemented treatments result in measurable progress towards individual project-level Desired Conditions
- Poor = 25% or less of implemented treatments result in in measurable progress towards individual project-level Desired Conditions

Ecological Outcome Measure 3: Watershed Condition

From the Act: ...a collaborative forest landscape restoration proposal shall-- describe plans to—

(C) maintain or improve water quality and watershed function;

Description and Justification

This indicator will rely on the Watershed Classification and Assessment Tracking Tool (WCATT) to provide information on watershed response to forest restoration treatments. WCATT is an existing database that has already assigned a watershed condition score for **every** 6th Order HUC (subwatershed) containing more than minor amounts of NFS lands within CFLR Landscape Areas. Desired Conditions should be stated as an overall WCATT score. Any reassessment of the WCATT scores must follow Watershed Condition Framework protocols, as outlined in the [Watershed Condition Framework](#) and the accompanying [Watershed Condition Classification Technical Guide](#). It should be noted that the Act requires “plans to maintain or improve water quality and watershed function”. Only in cases where a Landscape’s proposal did not address water quality or watershed function should Landscapes fail to address this indicator.

Guidance on Specifying Desired Conditions for use in National Reporting

- Desired Conditions should explicitly identify the relevant watershed and its relative priority.
- Desired Conditions should clearly identify which watersheds will be improved and which will be maintained in their current state.
- The Desired Condition statement should be expressed in terms of overall impact on WCATT score. The Desired Condition statement may also use specific indicators within the WCATT where appropriate; project groups should clearly identify the indicator that will be used to determine its status (i.e., the WCATT score AND number of roads remove, etc.)
- The spatial scale (e.g., treatment, sub-watershed, watershed etc.) of the Desired Condition should be explicitly identified.
- The temporal scale (e.g., FY, 3 year, 5 year, etc.) of the Desired Condition should be explicitly identified.

Scoring for National Reporting

Landscape-scale scoring

- Good = Expected progress is being made towards Desired Conditions across ____% of the subwatersheds within the CFLR landscape area.
- Fair = Expected progress is being made towards Desired Conditions across ____% of the subwatersheds within the CFLR landscape area.

- Poor = Expected progress is being made towards Desired Conditions across ____% of the subwatersheds within the CFLR landscape area.

“Expected progress” will be defined using 3-, 5-, and 7-year benchmarks for each DC based on a percentage of the 10-year outcome specified in each Landscape’s proposal.

Project-scale scoring

- Good = 75% or more of watersheds treated within a year maintain or show improvement in WCATT score
- Fair = 26%-74% of watersheds treated within a year maintain or show improvement in WCATT score
- Poor = 25% or less of watersheds treated within a year maintain or show improvement in WCATT score

Ecological Outcome Measure 4: Invasive Species

From the Act: *...a collaborative forest landscape restoration proposal shall-- describe plans to— (D) prevent, remediate, or control invasions of exotic species*

Description and Justification

The presence of invasive species on the landscape poses a serious risk to native ecosystems. If left untreated, invasive species can alter hydrological systems, degrade habitat, overtake native groundcover, and alter fire behavior and severity ultimately leading to an undesired ecological trajectory. In addition, forest management activities may create site disturbances through the use of mechanical devices and may unintentionally provide pathways and vectors for the introduction and spread of invasive species within the CFLR area. Accounting for both management actions taken on existing infestations as well as new infestations that emerge during the life of the proposed landscape restoration treatments will be critical to assessing whether a landscape has met its objectives with respect to invasive species. Invasive species activities within the CFLR Landscape may include surveys, inventories, and treatments against targeted invasive species, supporting prevention, early detection & rapid response.

Guidance on Specifying Desired Conditions for use in National Reporting

Desired Conditions under this indicator should be directly associated with the restoration outcome for the management unit’s invasive species program, and may address either the invasive species infestation itself or improving the resilience of the site against new invasions (e.g., increases in native understory species cover or biodiversity). On a landscape-scale (within the broader CFLR Landscape) the number of acres restored against invasive species are those where the targeted invasive species was prevented, controlled, or eradicated for the period of the CFLR landscape restoration and should be based upon annual evaluations of treatment efficacy over the life of the CFLR implementation. This same concept holds true at a smaller, project-level scale for individual treatments within the CFLR Landscape.

For Existing or Known Infestations Within the Landscape

- Utilize species-specific or site-specific risk assessments and a structured decision making approach to set treatment priorities and desired conditions within the Landscape.
- The Desired Conditions statement should articulate the restoration outcome (percentage of the area to be restored) and clearly define the actions which will be taken to achieve that outcome.
- The temporal and spatial aspects of the desired restoration outcome should be articulated in the Desired Conditions statements.
- Plan for the number of acres to be restored in the Landscape and estimate the desired average treatment efficacy level for activities against existing targeted invasive species infestations in the Landscape. Include the estimated number of acres to be restored and the desired average treatment efficacy level in the Desired Conditions statements.
- For national reporting, record all survey, inventory, and treatment data in the national NFS databases of record (NRM-TESP-IS and NRM-FACTS) using the NRM Invasive Species Integrated User Interface. Forests should ensure that all invasive species management data collected by Landscape cooperators are properly recorded in the national databases. Follow all national NFS invasive species program record keeping and reporting protocols and requirements (See <http://fsweb.wo.fed.us/invasivespecies/>).
- Overall restoration performance will be summarized in gPAS for all invasive species treatment activities conducted within the Landscape. These results can be used to evaluate the overall “Good, Fair, Poor” measures of success for the CFLR. Focus evaluations only within the Landscape using data associated with the specific treatment areas.

Early Detection and Rapid Response (Infestations Previously Undetected)

- Whenever possible, utilize existing surveys and inventories of invasive species infestations within the Landscape to focus detection activities more efficiently. Assume that some infestations were missed by previous surveys and plan accordingly.
- EDRR activities should focus on new or small infestations across the Landscape, or may focus on monitoring high-risk pathways and vectors (construction areas, campgrounds, roads, fuels reduction areas, staging areas, sources of materials, etc.) which may introduce new invaders.
- Utilize species-specific or site-specific risk assessments and a structured decision making approach to set rapid response (treatment) priorities and desired conditions within the Landscape.
- For proposed EDRR activities the Desired Conditions statement should include the spatial and temporal aspects of the Landscape.
- With respect to “rapid response”, the Desired Condition statement should specify a planned treatment efficacy level of 100% (eradication) for the targeted infestations within the Landscape over the life of the Landscape; articulating that annual follow-up monitoring will be conducted to ensure this level is met by the end of the Landscape period.

Scoring for National Reporting

Overall restoration performance will be summarized in gPAS for all invasive species treatment activities conducted within the Landscape Area. These results can be used to evaluate the overall “Good, Fair, Poor” measures of success for the CFLR Landscape. Focus evaluations only within the Landscape using data associated with the specific treatment areas. **A high level of restoration outcome performance (%) will result in a low “severity” level.**

Landscape-scale Scoring

Target for Landscape Scale Invasive Species Severity: ____ (%) of the CFLR Landscape area was restored by reducing invasive species severity (preventing, controlling, or eradicating targeted invasive species) to meet desired conditions by ____ date.

- **Good (Low Severity)** – Treatment activities conducted to meet the Invasive species Desired Conditions result in an **average** restoration performance outcome of 90% – 100% across all invasive species treatment activities within the CFLR Landscape over the life of the CFLR Landscape. The **actual** number of acres restored is at least 90% of the **planned** number of acres restored across the entire CFLR Landscape.
- **Fair (Medium Severity)** – Landscape activities conducted to meet the Desired Conditions result in an **average** restoration performance outcome of 70% – 89% across all invasive species treatment activities within the CFLR Landscape over the life of the CFLR Landscape. The **actual** number of acres restored is 70%-89% of the **planned** number of acres restored across the entire CFLR Landscape.
- **Poor (High Severity)** – Landscape activities conducted to meet the Desired Conditions result in an **average** restoration performance outcome of 0% – 69% across all invasive species treatment activities within the CFLR Landscape over the life of the CFLR Landscape. The **actual** number of acres restored is less than 70% of the **planned** number of acres restored across the entire CFLR Landscape.

Project-scale Scoring

Target for Project Scale Invasive Species Severity: ____ (%) of the Treatment Area was restored by reducing invasive species severity (preventing, controlling, or eradicating targeted invasive species) to meet desired conditions of the project by ____ date.

- **Good (Low Severity)** = Treatment activities conducted to meet the Desired Conditions result in a restoration performance outcome of 90% – 100% across the treatment area for the life of the project. The actual number of acres restored is at least 90% of the planned number of acres restored across the entire treatment area.
- **Fair (Medium Severity)** = Treatment activities conducted to meet the Desired Conditions result in a restoration performance outcome of 70% – 89% across the treatment area for the life of the project. The actual number of acres restored is 70%-89% of the planned number of acres restored across the entire treatment area.

- Poor (High Severity) = Treatment activities conducted to meet the Desired Conditions result in a restoration performance outcome of 0% – 69% across the treatment area for the life of the project. The actual number of acres restored is less than 70% of the planned number of acres restored across the entire treatment area.