**Social and Economic Monitoring**

**Rowe Mesa Landscape-Scale Assessment: Planning for Fire-Focused Forest Restoration**

Restoration efforts on Rowe Mesa have been supported by 3 previous CFRP grants. These grants have provided short-term jobs and have supported outreach to the greater Pecos community and many of the users of Rowe Mesa. Through these grants, collaborators have gained a more in-depth understanding of the Rowe Mesa community and their perspectives on forest restoration. However, implementation of the Rowe Mesa fire-focused restoration project is different from previous CFRP projects on Rowe Mesa because it specifically seeks to implement landscape scale restoration through the use of fire in both ponderosa pine (the forest type of previous grants) as well as piñon-juniper systems. Therefore, socioeconomic monitoring for the proposed project will focus on the following:

* Increasing understanding of challenges and needs to implement landscape scale fire-focused restoration and offering potential solutions to challenges through interviews with land managers and project collaborators; and
* Increasing understanding of restoration at a landscape scale, the fire history of Rowe Mesa, and fire regimes in different forest types (specifically ponderosa pine and piñon-juniper).

Increasing the understanding of challenges or barriers to implementation of fire-focused restoration is critical to the long-term success of this and other landscape-scale efforts. Monitoring will focus on identifying the barriers, as articulated by land management staff and collaborators, and will also seek to identify solutions to these barriers, whether or not those solutions can be implemented during the project timeframe. Potential challenges may relate to personnel, financial or policy issues that do not support landscape scale, fire-focused restoration, but they also may relate directly to the understanding of restoration and fire behavior at a landscape scale, as discussed below.

Increasing the understanding of restoration at a landscape scale is also important, particularly as it relates to community understanding of and expectations for fire behavior in different forest types. While community understanding of restoration and fire behavior in ponderosa pine has become increasingly sophisticated over the life of the CFRP, these same principles are much less well understood in piñon-juniper systems. These systems are inherently more difficult for community members to understand because the ecology of their restoration is also less well understood. In addition, fire in PJ systems may result in higher tree mortality than in adjacent ponderosa pine areas. This is potentially a cause for concern among community members because they rely on these tree species for piñon nuts and firewood. It is important that community members understand the risk involved in restoration of fire across the landscape, as well as the potential benefits, including the long term health of Mesa ecosystems, improved wildlife habitat, and improved forage for cattle. Community understanding and perceptions will be assessed primarily through the training that youth and educators receive. As well, these perceptions will be assessed through comments and concerns expressed during the NEPA process. Monitoring will therefore focus on the number and types of trainings that increase understanding of landscape scale restoration on Rowe Mesa, as well as scientific, management, and community perceptions of its effectiveness. In addition, monitoring will evaluate the effectiveness of the landscape assessment in guiding the prescription. Analysis of this latter indicator will also be guided by ecological monitoring data regarding the effectiveness of this restoration approach in achieving ecological objectives.

This grant also will use indicators and methods from the *Short Guide for Grant Recipients* to track the basics of any restoration project, including the number and types of jobs and value of wood products produced; however, the socioeconomic monitoring plan will focus on the education and outreach objectives of the grant looking specifically at collaboration, adaptive management, and education of youth and educators, specifically with regard to whether they address and/or increase understanding of the following conditions:

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| **Existing Condition** | **Desired Future Condition** | **Sample Measurements** |
| Community understanding of landscape scale restoration not well understood | Increase community & youth understanding of landscape scale restoration | Number & types of trainings & skills gained in education and outreach |
| Youth education ends with CFRP project | Increase capacity of teachers to train youth | Number & types of trainings and skills gained |
| PJ restoration not well understood | Increase scientific, management, and community understanding of restoration within PJ system | Number and types of training; effectiveness of landscape assessment in guiding prescription; scientific, management, and community perceptions |
| Approaches to landscape scale assessments are new to some resource managers | Improved capacity to implement landscape scale assessments | Management perceptions about personnel & economic needs for landscape scale work |

Proposed Monitoring Plan:

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| **Indicator** | **Sampling Method** | **Form of Data Reporting/Analysis** |
| Number and kinds of jobs provided (person and FTE jobs) | Document review | Quantitative with short explanatory narrative |
| Volume and value of wood extracted | Document review | Quantitative with short explanatory narrative |
| Collaborative and adaptive management, specifically related to implementation of landscape scale fire-focused restoration and PJ restoration | Document review (internal, FS, and NEPA related documents); key informant interviews | Narrative that articulates challenges and barriers to implementation and potential solutions to these barriers; number and types of meetings held (multiparty and otherwise) |
| Number of youth trained; number and types of youth training | Document review | Quantitative with short explanatory narrative |
| Number of educators trained; number and type of training | Document review | Quantitative with short explanatory narrative |

Monitoring Cost

We estimate that a contractor could collect and analyze indicators that require document review in approximately 40 hours. The interviews with key project managers and related analysis would take an additional 45 hours, with an estimated cost of $5,000 for socioeconomic monitoring. The socioeconomic monitoring contractor should be versed in the methods described and familiar with social and economic issues related to forest restoration in northern New Mexico, and ideally with Rowe Mesa in particular.

**Ecological Monitoring**

**Rowe Mesa Landscape-Scale Assessment: Planning for Fire-Focused Forest Restoration**

Restoration efforts on Rowe Mesa have been supported by 3 previous CFRP grants. These grants have treated XX acres in ponderosa pine forests with subsequent prescribed fire on XX acres. Implementation of the Rowe Mesa fire-focused restoration project is different from previous CFRP projects on Rowe Mesa because it specifically seeks to implement landscape scale restoration through the use of fire in both ponderosa pine (the forest type of previous grants) as well as piñon-juniper systems. Ecological monitoring of the Rowe Mesa project will be different from many CFRP projects in that the focus of analysis and some data collection will be focused on fire effects and behavior, rather than on forest structure alone. As such, it will have two monitoring components: (1) monitoring of stand structure in treatment areas and (2) monitoring of fire behavior at the landscape level. The entire monitoring plan will address the following current and desired future conditions:

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| **Existing Condition** | **Desired Future Condition** | **Sample Measurements** |
| High risk of crown fire | Lowered risk of crown fire through strategic treatments and prescribed fire | CFRP protocols: Tree species, size, density; canopy cover; crown base height  Fire modeling: FVS, Landfire, Nexus |
| Surface fuels patchy, with dense patches in proposed treatment sites | Reduced surface fuel loads | CFRP protocols: surface fuels |
| Ground cover patchy, with areas of bare soil or low densities of grasses or forbs unable to carry surface fire | Increased percentage of forbs and grasses and increased ability to carry surface fire | CFRP protocols: ground cover |
| Forest structure provides poor wildlife habitat | Improved wildlife habitat | CFRP protocols for snag size and density, analyzed for cavity nesting bird habitat |

**Proposed Monitoring Plan**

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| **Indicator** | **Metric** | **Analysis** |
| Adult, sapling, and seedling density | Trees per acre by size class | % change across size classes |
| Snag density | Snags per acre by size class | % change |
| Mean adult species and size | Inches, by species and aggregate | % change by species and aggregate |
| Mean snag size | Inches | % change across size classes |
| Mean adult live CBH | Feet | % change |
| Basal area | Ft2/acre | % change |
| Surface Fuel | Tons/acre | % change |
| Understory cover | % by cover type | % change |
| Propagation of fire | Predicted fire behavior | Fire models |

**Sampling**

Because this project will prepare the mesa for prescribed fire across a large area of the mesa, monitoring needs to assess the impacts of the project in 4 different treatment areas plus two controls:

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| PIPO, treated, burned | PJ, treated, burned |
| PIPO, untreated, burned | PJ, untreated, burned |
| PIPO untreated, unburned | PJ, untreated, unburned |

Monitoring in treated PIPO and PJ areas will follow a pre- post-treatment model, where indicators are measured both before and after treatment, and then again after fire is reintroduced onto the landscape (3 sampling sets). Monitoring in untreated areas will require data collection one time during the pre-treatment phase, and then again after fire is reintroduced (2 sampling sets).

Monitoring Cost:

We estimate that a monitoring contract could collect data from these four treatment types, estimated in 4 days for each treatment type. This would be 16 field days for pre- treatment and 8 days post-treatment (only treated sites will be re-measured), and 16 days post fire. In addition, the contractor would require analysis and reporting time, estimated at 40 hours. The total hours would then be approximately Transportation costs to the site should also be included in the monitoring budget as well as attendance of multiparty meetings. The budget, detailed below, would require $19,550 for ecological monitoring. The ecological monitoring contractor should have experience collecting ecological data in ponderosa pine and PJ systems and ability to analyze data as described.

**Estimated Monitoring Budget – Ecological Monitoring**

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| **Task** | **Units** | **Amount** |
| Pre treatment collection | 16 days @ 8 hrs/day \* $50/hr | $6,400 |
| Post treatment collection | 8 days @ 8 hrs/day \* $50/hr | $3,200 |
| Post fire collection | 16 days @ 8 hrs/day \* $50/hr | $6,400 |
| Data analysis & reporting | 40 hrs \* $50/hr | $2,000 |
| Multiparty meeting attendance | 3 meetings @ 2 hrs each \*$50/hr | $300 |
| Travel | 40 trips @ 60 miles \* $0.52/hr | $1,250 |
| Total ecological monitoring |  | $19,550 |

**Monitoring Plan Overview**

**Goal, Indicators, Methods, Timeline**

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| **Goal** | **Indicator** | **Method** | **Where to collect** | **When to collect** | **Who to collect** |
| Increased community & youth understanding of landscape scale restoration | Number of youth trained; number and types of youth training | Document review | Santa Fe | Annually | SE Monitoring contractor |
| Increased capacity of teachers to train youth | Number of teachers trained; number and types trainings | Document review | Santa Fe | Annually | SE Monitoring contractor |
| Increased scientific, management, and community understanding of restoration within PJ system | Collaborative and adaptive management, specifically related to implementation of landscape scale fire-focused restoration and PJ restoration | Document review and interviews | Santa Fe/Pecos | Minimum of 3 times during life of project | SE Monitoring contractor |
| Improved capacity to implement landscape scale assessments | Collaborative and adaptive management, specifically related to implementation of landscape scale fire-focused restoration and PJ restoration | Document review and interviews | Santa Fe/Pecos | Minimum of 3 times during life of project | SE Monitoring contractor |
| Increase jobs in local communities | Number and kinds of jobs provided (person and FTE jobs) | Document review | From thinning contractor | Annually | SE Monitoring contractor |
| Assist small wood businesses by contributing to supply | Volume and value of wood extracted | Document review | Pecos |  |  |

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| **Goal** | **Indicator** | **Method** | **Where to collect** | **When to collect** | **Who to collect** |
| Lowered risk of crown fire through strategic treatments and prescribed fire; Return to historic conditions | Fire behavior | Fire modeling  Aerial photographs | Pecos, Tucson | Before and after prescribed fire (2x) | U of A |
| Live and Dead tree density, species and size by class | CFRP protocols | Rowe Mesa, within 4 sampling areas | Before and after treatment & after prescribed fire (2x for untreated areas; 3x for treated areas) | Ecological monitoring contractor |
| Crown base height |
| Basal area |
| Reduced surface fuel loads | Surface fuel loads | CFRP protocols | Rowe Mesa, within 4 sampling areas | See above | Ecological monitoring contractor |
| Increased percentage of forbs and grasses and increased ability to carry surface fire | Understory cover | CFRP protocols | Rowe Mesa, within 4 sampling areas | See above | Ecological monitoring contractor |
| Improved wildlife habitat | Snag density and size | CFRP protocols | Rowe Mesa, within 4 sampling areas | See above | Ecological monitoring contractor |