Colorado Front Range Collaborative Forest Landscape Restoration Project:

Social and Economic Monitoring Report for 2011

Kathie Mattor, Kawa Ng, Julie Schaefers, Tony Cheng, and Carrie Tremblatt

Colorado Forest Restoration Institute, Colorado State University
Fort Collins, CO 80523

Rocky Mountain Regional Office and Washington Office, USDA Forest Service
Golden, CO 80401

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COLORADO FOREST RESTORATION INSTITUTE

Colorado State University

Executive Summary

Colorado's Front Range landscape holds tremendous social, economic, and ecological value across the region. The Colorado Front Range Collaborative Forest Landscape Restoration Project (FR-CFLRP) intends to protect these values through forest restoration across a 1.5 million-acre collaboratively identified landscape. The FR-CFLRP is overseen by the Front Range Roundtable (FRR), a longstanding forest collaborative, in conjunction with the Arapaho-Roosevelt and Pike-San Isabel National Forests.

This report presents the findings from the social and economic monitoring assessment of the FR-CFLRP for 2011-2012. This project-level assessment identifies the local economic contributions and summarizes the wood utilization associated with the FR-CFLRP. Social perceptions toward prescribed fire are examined, followed by an analysis of the levels of collaboration occurring during the development and implementation of the FR-CFLRP.

Economic Contributions

The opportunity to create jobs and support local economies is a high priority for the FR-CFLRP. A detailed analysis of the contract-level economic contributions in calendar year 2011 was carried out to identify the extent these economic goals were met. It should be noted that the economic impact estimates in this analysis contrast with the estimates reported in the FY2011 CFLRP Annual Report (USFS 2012) due to differences in methodologies and data assumptions (outlined in Appendix C).

Six task orders associated with the FR-CFLRP were initiated in 2011, with three of these task orders fulfilled and three partially completed by the year's end. The economic effects of these restoration activities were identified using Input-Output (I-O) modeling of pertinent operational expenditure and labor information obtained from the contractor. Our analysis estimates the restoration activities contributed approximately $1.8 million in labor income and $1.6 million in GDP to the local economy. These contributions to the local economy were stimulated by the contractors' operation expenditures as well as labor income.

Table 1. Economic Contributions of Front Range CFLR Task Orders

Employment (full and part time jobs)	Labor Income (2010 US)	Value Added (2010 US)
38	$1,894,705	$1,616,964

In addition, a total of 38 full- and part-time jobs were calculated. All company employees reside within Colorado and are able to commute to work. The FR-CFLRP contractor subcontracts with other companies to assist with manual forest management operations and to conduct all trucking operations. The contractor was responsible for 70 percent of the total number of hours billed, with all mechanical work being completed by the contractor and a majority of the manual work (92 percent) completed by out-of-state subcontractors based in Florida and Oregon.

Recommendations for Future Monitoring – Economic Contributions

1. The 2011 FR-CFLRP monitoring of local economic impacts and wood utilization used labor and operational expenditures obtained directly from the contractor. This analysis adds to the national fiscal year report by providing a more locally-based understanding of the project's social and economic impact. This locally-based analysis should be completed on an annual basis.
2. Additional labor and operational expenditures should be collected for other project activities under the FR-CFLRP project. This could include labor and expenditures related to the FRR science and monitoring team and service contracts related to additional restoration activities (e.g. invasive weed mitigation or road decommissioning). This would provide a more complete understanding of the labor and economic impacts of the FR-CFLRP project.
3. Collect and analyze leveraged funds data (both in-kind and monetary) to determine the additional resources this collaborative project has brought in.

Wood Utilization

A total of 3,170 acres were treated under the FR-CFLRP in 2011, with 1,468 acres treated on the Pike-San Isabel National Forest (PSI) and 1,592 acres treated on the Arapaho-Roosevelt National Forest (AR). The majority (93 percent) of the materials removed on the PSI were through mechanical treatments, whereas 75 percent of the treatments on the AR were completed manually. The material harvested manually was not available for value-added uses, whereas 99 percent of the materials in the mechanized units were. This is due to the types and quality of materials removed through these treatments. These treatment prescriptions were identified to meet the restoration goals outlined by the National Forest plans and the FR-CFLR. All of the value-added materials were purchased by twelve Colorado businesses, either in the same county or a county neighboring where the work was being done. The value-added materials included sawtimber, blue stain wood, small diameter timber, products other than logs, limbs and brush, and bark fines. Materials from the PSI were turned into an assortment of products with the largest portion going to pallet and crate production and only two percent going to dimensional lumber. The majority of materials from the AR went to landscaping, followed by pallets and crates, firewood, and wood fuel pellet production.

Recommendations for Future Monitoring – Wood Utilization

1. For the 2011 report we collected green ton numbers preventing the ability to fully calculate the economic effects of wood utilization. We recommend collecting CCF (or at least dry ton numbers) in order to better calculate the local economic effects of wood utilization.

Social Perceptions

By understanding public perceptions towards forest management natural resource managers will be better equipped to effectively collaborate with local stakeholders associated with the FR-CFLRP. Because the FR-CFLRP proposal indicates an increased use of prescribed fire management during project implementation, a literature review of research on social perceptions toward prescribed fire was completed for this report. Existing research highlights that while prescribed fire as a forest management treatment may contradict years of suppression management and public discourse, there is general support for the use of prescribed fires in forest management. The key concerns toward the use of prescribed fire that have been identified include: (1) fear of an escaped catastrophic fire, (2) poor air quality, (3) harm to wildlife and fish habitat, and (4) impacts on aesthetics. Studies have found three main categories of factors influencing social perceptions related to prescribed fire: contextual and location based factors, beliefs and attitudes, and knowledge and experience. The literature reviewed also identifies the importance of public outreach and effective outreach methods related to prescribed fire. Findings suggest that interactive methods are generally more successful in building trust and acceptance of prescribed fire and those managing its planning and implementation. Also, as members of the public learn more about prescribed fire and the associated tradeoffs they tend to become more tolerant of the use of prescribed fire.

Recommendations for Future Monitoring – Social Perceptions

1. A literature review of research on social perceptions toward prescribed fire across the country was conducted for the 2011 monitoring report. Because these perceptions may vary by region, and may be influenced by Colorado's 2012 fire season, a review of social perceptions specific to the FR-CFLRP project region should be conducted for the 2012 report. This should include both peer-review and popular press articles.
2. The 2011 social perceptions report was an initial review of the current research with a focus on prescribed fire. Future reports should consult social science research on additional forest management techniques, as well as provide updates on prescribed fire literature.
3. The information identified on factors influencing public perceptions and effective methods for public outreach should be used to develop and implement a plan for public outreach to improve public understanding and discussion of the FR-CFLRP project.

Collaboration

Collaboration is a key component of the Front Range Roundtable. Interviews were conducted with 15 FRR members to develop a detailed assessment of FR-CFLRP collaboration. The members interviewed indicate a diverse representation of interests involved with the FRR and/or the FR-CFLRP monitoring. Most members have found the FR-CFLRP has had a positive effect on relations among members as well as relations between the FRR and other organizations. They reported high levels of trust and strong commitments to work toward agreement on important decisions related to the project. This was attributed to the open and frequent communication which occurs among FR-CFLRP partners and monitoring team members. Many also agreed the collaborative was having an influence on the current implementation of the FR-CFLRP by providing feedback and resources, as well as informing future forest treatments. The FRR has also faced some challenges in their FR-CFLRP collaborative efforts. Although no interested parties have intentionally been excluded from the process some missing interests were identified by several members. Second, many members of the FR-CFLRP monitoring team felt they do not have a clear sense of their roles or responsibilities. This was attributed to not having a defined process by which the FRR collaborative supports or influences the implementation of the FR-CFLRP. Third, some members felt the FRR collaborative had little influence on the implementation of current projects because these had gone through the required planning processes prior to receiving the FR-CFLRP project grant. Regardless of these challenges, the members interviewed were optimistic about the collaborative effort and see the FR-CFLRP as a significant opportunity to achieve common objectives across diverse interests. In the time since these interviews took place both the FRR and the monitoring team have begun to address these challenges.

<u>Recommendations for Future Monitoring – Collaboration</u>

1. A baseline measure of collaboration was established through key informant interviews conducted by the Colorado Forest Restoration Institute for the 2011 monitoring report. Additional interviews with key informants should be conducted every 3-5 years to track the challenges, achievements, and lessons learned associated with the FR-CFLRP collaborative process.

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Goals and Indicators

The Colorado Front Range Collaborative Landscape Restoration Project (FR-CFLRP) is one of 23 projects funded nationally under the Collaborative Forest Landscape Restoration program of the USDA Forest Service (USFS). It is intended to accelerate ongoing forest restoration treatments that provide long-lasting ecological, social and economic benefits across a 1.5 million-acre landscape covering parts of the Arapaho-Roosevelt and Pike-San Isabel National Forests in Colorado. This project will facilitate additional treatment of approximately 32,000 high-priority acres on National Forest System (NFS) lands within the Front Range Roundtable's designated 800,000-acre restoration zone and will be enhanced by existing and future treatments on adjacent federal and non-federal lands. A large portion of the 800,000 acre restoration zone is within the wildland-urban interface and will be the focus of the 32,000 acres of treatment.

More than 70 percent of the forests (both federal and non-federal) within this proposed area exhibit a high to very high degree of ecological departure from historic norms and are susceptible to uncharacteristic high intensity wildfire and insect and disease infestations. These conditions increasingly threaten human health and well-being, as well as critical ecosystem services throughout the region. Through strategic placement of treatments, the FR-CFLRP plans to restore historic fire regimes, including low intensity wildland fires, with a goal of reducing risks to the ecosystem and communities and lowering suppression costs. Much of the area is deemed critical for protecting communities and municipal watersheds (which supply drinking water to over 75 percent of Colorado's population) from the impacts of uncharacteristic fire.

Project treatments will be strategically placed to maximize timely implementation and benefits on the ground. The first three years of treatment will focus on areas within the Roundtable's restoration zone where: 1) National Environmental Policy Act (NEPA) review is complete; 2) complementary work

has already occurred or is underway and can be leveraged for a larger-scale outcome; 3) both ecological and community protection priorities can be simultaneously addressed; 4) work by non-federal partners on adjacent lands will complement management on federal lands; and/or 5) opportunity exists to create jobs and support local economies.

Opportunities for job creation, business support and development, and meaningful biomass utilization are emphasized in the design and implementation of treatments. The goal of the socioeconomic monitoring for 2011-2012 was to measure the social and economic contributions of the FR-CFLRP project study area and to develop a baseline measure for future monitoring efforts. The socioeconomic monitoring plan is based upon: 1) topics and indicators identified by the FR-CFLRP monitoring group, and 2) national CFLR program monitoring outcomes and indicators. The monitoring plan identifies four key objectives for the 2011 socioeconomic assessment:

1. Determine the economic contributions associated with the FR-CFLRP project funded task orders;
2. Measure the types and amounts of wood utilization that occurred as a result of these funded task orders;
3. Measure public acceptance for an increased pace and scale of forest management, specifically mechanical treatments and prescribed fire;
4. Identify the levels of collaboration in the development and implementation of the FR-CFLRP project.

Between June and September 2011, a robust multi-party monitoring protocol was developed to measure these social and economic objectives:

Objectives	**Indicator**
Identify Economic Contributions	- Labor income and value-added economic impacts of FR-CFLRP project task orders - Total employment generated by the project - Location of employees and sub-contractors - Amount of mechanical and manual work associated with project task orders
Measure Wood Utilization Levels	- Amount and type of materials generated from FR-CFLRP project task orders - Location of businesses purchasing materials - Types and relative value of products created from these materials
Determine Social Perceptions of Forest Treatment	- Acceptance of frequent low intensity wildfire, prescribed fire, and/or other mechanical treatments - Perceived benefits or issues of restoration activities (pace and scale) and other mechanical treatments - Public attitudes toward the project and collaborators
Identify Levels of Collaboration	- Level of commitment to collaboration, communication, and group learning - Extent that stakeholders previously in conflict are now working together - Fairness, transparency and timeliness of information sharing among all participants

The remainder of this report presents the findings associated with each of the four objectives. Subsequent appendices provide background information to the Collaborative Forest Landscape Restoration program and the Front Range Roundtable, as well as the methods used to obtain this data.

Findings

The following subsections outline our findings on the economic contributions, wood utilization, social perspectives, and levels of collaboration associated with the FR-CFLRP.

Economic Contributions

The CFLR program funding proposal requirements sent to Regional Foresters identified multiple topics to be addressed. The investments section specifically asks: "Will jobs be created? If so, what kind, how many, and for how long?" This analysis estimates the economic effects resulting from the implementation of CFRL program funded restoration treatments on the Pike-San Isabel and the Arapaho-Roosevelt National Forests in 2011.

The FR-CFLRP contractor worked on six task orders associated with this project in 2011, with three task orders fulfilled completely and three partially completed. The economic effects of these restoration activities were identified using IMPLAN® (IMpact analysis for PLANing), a regional economic impact analysis system commonly used by the USFS to model pertinent operational expenditure and labor information obtained from the contractor. This analysis estimated the restoration activities contributed approximately $1.8 million in labor income and $1.6 million in value-added (i.e. Gross Domestic Product or GDP) contributions to the local economy in 2011 (Table 1). These contributions to the local economy were stimulated by the contractors' operation expenditures as well as labor income.

Labor income includes all forms of employment income (wages, benefits, and proprietor income). The value-added contributions consist of: (1) employee compensation – wages and salaries plus benefits paid by local industries; (2) proprietor income – income from self-employment; (3) other property income – corporate income, rental income, interest and corporate transfer payments; and (4) indirect business taxes – sales, excise, fees, licenses and other taxes paid, including non-income based payments to the government.

Table 1. Economic Contributions of Front Range CFLR Task Orders in 2011

Employment (full and Part time jobs)	Labor Income (2010 US)	Value Added (2010 US)
38	$1,894,705	$1,616,964

Additionally, a total of 38 full- and part-time jobs were calculated. Jobs reported in IMPLAN are annual averages of both full- and part-time total wage and salary employees, as well as self-employed jobs. This method of counting employment is a standard convention and consistent with methods used by the U.S. Bureau of Labor Statistics. However, one cannot discern the number of hours worked or the proportion of work that is full-time time vs. part-time. It is also important to reiterate the employment contributions calculated are reported simply as jobs, not full time equivalents (FTEs). The impacts include both full- and part-time employment; therefore a person with more than one job could show up more than once in the data. This prohibits comparisons to population data and inferences about the effect on unemployment rates. It is also important to note that IMPLAN is a static model representing a snapshot in time. While task orders considered in this analysis were carried out in 2011 the data used in this IMPLAN model is for the year 2010 (the latest available IMPLAN data). Therefore, the model represents the state of the economy in the study area in 2010.

In addition to the economic contributions data, the contractor also supplied information concerning the location of their employees and subcontractors. The company employees all reside within Colorado and are able to commute to work on a daily or weekly basis (some crews prefer to live on site during the week). The initial long-term stewardship contract awarded in 2009 (prior to the FR-CFLRP project being funded) allowed the contractor to hire additional permanent employees, from both in- and out-of-state locations.

The contractor implements most of the contract work but does subcontract with other companies to complete some of the manual forest management operations. All of the trucking

operations are managed by a separate company that hires independent truck drivers. In 2011 the contractor was responsible for 70 percent of the total number of hours billed (both mechanical and manual labor). Subcontractors were not used for any of the mechanical work in 2011; all mechanical work was therefore completed by the Colorado-based contractor. However, the majority of the FR-CFLRP project's manual work (92 percent) was completed by subcontractors based out of Florida and Oregon.

Photo: Pam Motley

Wood Utilization

The following section reports the number of acres treated by treatment type, the types of materials sold, the products produced from those materials, and the number and location of the businesses to which the materials were sold.

A total of 3,170 acres were treated under the FR-CFLRP project in 2011, with 1,468 acres treated on the Pike-San Isabel National Forest (PSI) and 1,592 acres treated on the Arapaho-Roosevelt National Forest (AR) (Table 2). The amount of material available for wood utilization largely depends upon the type of treatment used. The forest treatments for the FR-CFLRP project were completed using two treatments – mechanical and manual. Mechanical treatments involve the use of heavy machinery and are less cost prohibitive and less labor intensive than the manual treatments which involve individual sawyers removing trees and brush designated by the USFS prescription. The majority, 93 percent, of the materials removed on the PSI were through mechanical treatments, whereas 75 percent of the treatments on the AR were completed through manual work.

Table 2. Number of acres treated in 2011 by treatment type and task order

National Forest	Task Order	Location (County)	Treatment Acres	
			Mechanical	Manual
Pike – San Isabel	Phantom Creek 1	Teller	597	0
	Phantom Creek 2	Teller	761	110
Total:			***1,358***	***110***
Arapaho–Roosevelt	Taylor	Boulder	391	126
	Estes Valley 5/ Walker Black	Larimer	0	120
	Thompson River 2	Larimer	0	630
	Walker Red	Boulder	0	325
Total:			***391***	***1201***

Photo: Pam Motley

There is a large difference in the availability of value-added materials based upon whether the treatments are mechanical or manual. Although manual treatments have a lower initial environmental impact, none of the material harvested manually was available for value-added use and 99 percent of this material was piled and burned (not as prescribed burns). This is due to the types and quality of materials removed through these treatments. These treatment prescriptions were identified to meet the restoration goals outlined by the National Forest plans and the FR-CFLR.

There was a much higher level of utilization in mechanized units with 99 percent of the material mechanically harvested being available for value-added uses such as sawtimber, products other than logs, and biomass. The remaining 1 percent was piled and burned. It was estimated that approximately 5-10 tons/ acre were left for wildlife habitat during both types of treatments.

A larger mix of mechanical and manual treatments would increase the amount of wood utilization of the FR-CFLRP project, a primary goal of the national CFLR program legislation.

What types of materials were sold?

The types of wood materials sold from the FR-CFLRP include sawtimber, blue stain wood, small diameter timber, products other than logs, limbs and brush, and bark fines. The majority of these materials were sold to buyers in the same county or a county neighboring where the work was being done.

Table 3. Amount of materials sold

National Forest	Material	Green Tons
Pike-San Isabel	Sawtimber and Small Diameter timber	7,641
	Products other than Logs (POL)	2,754
	Limbs/ Brush	2,106
	Bark Fines	6,615
	Total:	***19,116***
Arapaho-Roosevelt	Small Diameter timber	170
	Blue Stain	155
	Products other than Logs (POL)	1,268
	Limbs/ Brush	1,134
	Total:	***2,727***

Who purchased these materials?

All of the value-added materials removed from these forests through the FR-CFLRP were purchased by twelve Colorado businesses.[1] Seven businesses purchased materials from the PSI contract work, four businesses purchased materials from the AR, and another business purchased materials coming from both forests. These businesses were located within or adjacent to the counties where work was completed – Adams, Boulder, Clear Creek, El Paso, Pueblo, Teller, and Weld Counties.

[1] Although some materials from other non-CFLR funded task orders were shipped to Washington, all materials from CFLR-funded task orders in 2011 were purchased by Colorado businesses.

What was created from these materials?

Estimates of the types of products developed from these materials were provided by the contractor (Table 4). Materials from the PSI were turned into an assortment of products with the largest portion going to pallet and crate production, followed by mulch and other landscape products. Of the total materials sold from the PSI task orders it is estimated that only 2 percent went to dimensional lumber. Materials from the AR also went to the development of a variety of products; the majority was used forlandscaping materials, followed by pallets and crates, firewood, and wood fuel pellet production.

Table 4. Products created

National Forest	Products created	Percent of total material sold:	Product Value
Pike - San Isabel	Pallets & Crates	38%	Medium
	Mulch	23%	Low
	Chips (Landscaping and Playground Material)	21%	Low
	Compost	14%	Low
	Dimensional lumber	2%	High
	Soil Fertilizer/ Biochar	1%	Low
	Firewood	1%	Low
Arapaho - Roosevelt	Playground Material, landscaping	71%	Low
	Pallets & Crates	17%	Medium
	Firewood	7%	Low
	Wood Fuel Pellets	5%	Low

Social Perceptions

There has been extensive social science research on social perceptions toward forest management techniques. The literature reviewed for this report focused primarily on social perceptions toward the use of prescribed fire, or controlled fires, on public lands because of the intention to use prescribed fire stated in the FR-CFLRP project proposal. Determining the factors that shape support is important for understanding how to engage the public and most effectively address common concerns and misunderstandings. This section presents research findings related to public understanding of the role of fire, common concerns regarding prescribed fires and the factors shaping public attitudes towards its use, and identifies useful outreach mechanisms for resource managers to better interact with the public when working with prescribed fire management.

Public concerns about prescribed fire

Studies show the public has a sophisticated understanding of the role of fire in forest ecosystems and the environmental factors contributing to increased fire risk. The public's understanding of the role of fire has been identified through surveys, interviews and focus groups in which a majority of the respondents were able to correctly answer forest ecology and fire risk related questions (McCaffrey and Olsen 2012). Existing research highlights there is general support for the use of prescribed fires in forest management, with location and concerns about outcomes being the primary determining factors (McCaffrey and Olsen 2012). Nonetheless, while general support tends to be high there remains a sizeable portion of the public opposed to the use of prescribed fire (Absher and Vaske, 2006; Delost, 2001; Manfredo et al, 1990; Winter et al, 2002).

The literature reviewed identifies four main concerns citizens have regarding the use of prescribed fire in forest management: escaped catastrophic fire, poor air quality, harm to wildlife and fish habitat, and the impact on aesthetics. A survey of residents in fire prone areas in the northeast found mid-levels of support for prescribed fire, with the number one concern being the potential for

prescribed fire to escape and burn out of control (Ryan et al, 2006). In a survey of the Great Lakes region, the biggest concern (by a large margin) was the risk of a prescribed fire getting out of control, with 70 percent of respondents reporting it to be a moderate to great concern (Shindler et al, 2009). Focus groups conducted with rural Michigan residents following a survey found much lower levels of acceptance of prescribed fire in Michigan than in other regions. The focus group discussions revealed a common fear held by the participants that prescribed fire was reckless. Many attributed this view to the nearby Mack Lake fire that resulted from a recent escaped prescribed fire (Winter and Fried, 2000).

While one would expect smoke to be one of the highest ranking concerns among the public, especially with those living in the wildland-urban interface (WUI), many studies show the public is relatively accepting of smoke as a side effect of prescribed fire (Brunsen and Evans, 2005; Lowe and Abrams, 2005; Ryan and Wamsley, 2006; Shindler et al, 2009; Weisshaupt et al, 2005; Winter et al, 2002). One survey of residents in fire prone areas in the northeast found very little concern over the impact of smoke in nearby communities (Ryan et al, 2006). A 2001 survey found the majority of respondents believe smoke from prescribed fire is acceptable (69 percent in the WUI, 56 percent of nonresidents) and a study completed in 2005 found that 76 percent of survey respondents believed smoke to be acceptable from prescribed fire (Lowe and Abrams, 2005). Another study found homeowners were more accepting of smoke when they believed that smoke from prescribed fire would reduce the overall amount of smoke they were subjected to by lowering the risk of more severe wildland fires (Weisshaupt et al, 2005).

Photo: Larry Huseman

A survey of residents in fire prone areas in the northeast found that the second highest concern over prescribed fire was harm to wildlife (Ryan et al, 2006). In the Great Lakes Region all other concerns outside of escaped fire were rated as moderate to great concern by fewer than 50 percent of survey participants (Shindler et al, 2009). Other concerns included increased soil erosion, loss of wildlife and fish habitat, damage to private property, increased levels of smoke, reduced scenic quality, economic loss of useable timber, deteriorated public water supply, effects on recreation opportunities, and lower traffic safety (Shindler et al, 2009).

Although social science research indicates a large portion of the public supports thinning and prescribed fire forest management techniques it is important for managers to consider local perceptions toward these practices as differences in public support have been found across geographic areas (Brunsen et al, 2004; Schindler et al, 2009). The relative support for prescribed fire along Colorado's Front Range should be further assessed prior to developing specific management actions for the FR-CFLRP so appropriate outreach and engagement measures can be taken.

Factors influencing social perceptions

Based on the literature review, there are three main categories of factors influencing social perceptions related to prescribed fire: contextual and location based factors, beliefs and attitudes, and knowledge and experience. The *condition of the forest* is one contextual factor influencing social perceptions. A study comparing support for prescribed fire among Colorado Front Range residents, urban Chicago residents, and Southern Illinois residents found that across all sites current forest conditions were the most important contextual factor influencing support for prescribed fire. If a wildfire was likely, support for prescribed fire as a treatment increased (Bright and Newman, 2006). This is consistent with an earlier study of Colorado Front Range residents where respondents were more likely to support prescribed fire if the wildfire risk was higher and there was a recent history of wildfire (Bright et al, 2007).

Photo: Larry Huseman

A number of studies have also demonstrated the *location of the prescribed fire* influences social perceptions. Support is generally higher for using prescribed fire in remote areas of the forest rather than near more urbanized areas (Bright et al, 2007; Bright and Newman, 2006). This theme was also identified in a survey of citizens in Salt Lake City, Arizona, Central Oregon, and the Colorado Front Range, where across all regions the citizens were more wary of the use of prescribed fire in populated areas

than in remote locations (Brunsen and Shindler, 2004). A survey of Long Island, New York and Plymouth Pine Barrens, Massachusetts also supports the notion that location matters. Respondents showed much lower support for prescribed fire close to homes. This was particularly true among higher density Long Island residents (Ryan et al, 2006).

The *location of the stakeholders* being surveyed also influences social perceptions related to prescribed fire. A 2001 study found that residents within the WUI were more supportive of widespread use of prescribed fire than non-WUI residents with 69 percent of WUI residents supporting wide use of prescribed fire and only 43 percent of nonresidents supporting the wide use of prescribed fire (Lowe and Abrams, 2005). In their cross-regional study, Brunsen and Shindler (2004) also found the most urban of the sample group surveyed were less concerned about wildfire and also less likely to give their full support to the use of prescribed fire (Brunsen and Shindler, 2004).

Beliefs and attitudes also have an important role in social perceptions toward prescribed fire. A 1990 survey of a regional group (Montana and Wyoming residents) and a national group found that the intention to support prescribed fires as a forest management tool was strongly attitudinal based. The survey found that 56 percent of the regional group and 53 percent of national group had positive attitudes toward the policy and those that supported the use of prescribed fire agreed it would result in positive outcomes, whereas those with negative attitudes were more likely to believe it would result in harmful consequences (Manfredo, 1990).

A 2010 study surveying Lake Tahoe residents found that *perceived risk* was the most important variable (compared with exposure and knowledge) in predicting support for prescribed fire. As perceived risk (associated with prescribed fire) decreased, support for prescribed fire increases (Ascher, 2010).

Researchers have also found that support for fire management approaches increased when the fire management approach was *linked to specific desired outcomes*. A mail survey of residents living in

six WUI counties in Colorado found 82 percent of respondents supported prescribed fires because of its perceived effectiveness in reducing wildfire risk (Absher and Vaske, 2006). Utilitarian, anthropocentric, biocentric, and preservation viewpoints also play a role in social perspectives toward prescribed fire. Research has found that individuals who identify with an anthropocentric viewpoint tended to be more supportive of fire management strategies than those with biocentric viewpoints (Liou et al, 2007). Another study found participants who viewed the forest as a "working forest" tended to be opposed to prescribed fire as a tool due to feelings that it wasted valuable timber resources, while other respondents expressed the "natural landscape" view where fire was seen as a natural process for forest self-regulation and supported the use of prescribed fires across the entire national forest (Cacciapalgia et al, 2011).

Knowledge and experience also influence social perceptions toward prescribed fire. Several studies have shown that people who support the use of prescribed fire demonstrated higher levels of understanding toward forest management and prescribed fire than those with negative views towards prescribed fire (Brunsen and Shindler,2004; Manfredo, 1990; Ryan et al, 2006). Another study indicated people who had experience with smoke, evacuation, prescribed fire, or involvement in natural resource or agricultural professions were more likely to be supportive of the use of prescribed fire and were also more likely to be more knowledgeable about fire (Ascher, 2010; Bright and Newman, 2006; Jacobson et al, 2001).

Negative experiences with prescribed fire have had mixed

effects on levels of support for prescribed fire management efforts. Focus group discussions in rural Michigan attributed much lower levels of acceptance of prescribed fire in Michigan than in other regions to a recently escaped prescribed fire (Winter and Fried, 2000). Meanwhile, Brunson and Evans (2005) found no statistically significant change in likeliness to support prescribed fire as a forest management tool after an escaped prescribed fire in Utah (Brunson and Evans, 2005). Another survey comparing acceptance levels in Michigan, California, and Florida found past experience was not a universal predictor of attitude towards prescribed fire because other variables (trust and personal importance) were found to be stronger predictors of treatment acceptance (Vogt et al, 2002).

Levels of trust were found to be a good predictor of public acceptance of prescribed fire. One of the important findings of Vogt, Winter, and Fried's survey comparing Florida, Michigan, and California counties was trust in the government to manage the forest was a good predictor of attitudes towards prescribed fire and other forest management approaches. This was particularly true for those with a negative attitude towards forest fire as they also had low levels of trust in the government to manage the forest (Vogt et al., 2002). This was also reflected in a study across five neighborhoods adjacent to public lands in Oregon and Utah where confidence in managers to use treatments and general trust in federal and state managers to make good decisions about fire and fuel management were found to be significantly correlated with public acceptance of prescribed fire (Toman et al, 2011). Another study of WUI homeowners, in three different regions (El Dorado and Placer Counties in California, Clay County in Florida, and Crawford, Ogemaw and Oscoda Counties in Michigan), supports the view that trust is significantly associated with perceived risks and benefits, and perceived agency competence (Winter et al, 2002; Winter et al, 2004).

Education and outreach – what works

Photo: CFRI

The literature on prescribed fire also identified the value of public education and effective outreach methods in relation to public support. Focus groups indicated they were generally willing to support a prescribed fire if it was well planned, involved citizen participation, and the responsible agency had adequate resources to manage the associated risks (Winter et al, 2002). This indicates the importance of involving the public during the planning and implementation of a prescribed fire as a way to inform them of the planning and resources involved. Research on agency-citizen interactions indicates agency outreach makes a big difference in forming positive views of forest managers and forest management techniques (Olsen and Shindler, 2010). Additional research identifying variations in support across regions highlights the importance of geographical context in understanding acceptability, so forest managers can effectively tailor an outreach strategy to specific regional concerns (Brunsen and Shindler, 2004).

Message framing is also an important component in devising strategies to engage and communicate with the public. In one study, individuals were more willing to accept the risk associated with fire management techniques if the technique was framed as necessary to restore the forest from previous loss and necessary to improve and maintain the system (Ascher, 2010). Another study involving residents adjacent to the Kootenai National Forest analyzed landowner place meanings as they relate to attitudes towards fire and fuel management (Cacciapaglia et al, 2011). The findings suggest that rather

than focusing on how individuals relate to special places, managers should focus on landscape level meanings and attachments in devising management strategies and communicating with the public because fuel management strategies focused on special places ignore the values and interests that are linked to landowner fuel management preferences (Cacciapaglia et al, 2011). Researchers have also found increased levels of support for fire management approaches when the approach was linked to a specific desired outcome, suggesting increased support for fire management approaches when homeowners understand the intended outcomes (Vogt et al, 2005).

It is important to understand what techniques are most effective in sharing information with the public in order to gain their support and trust. Research has examined which outreach and education tools work best to build trust. A survey of residents in the Great Lakes region indicated guided tours and conversations with agency personnel were the most helpful (<50 percent) for developing confidence in fire managers using prescribed fire, pointing to the need for more interactive and personalized sources of public education and outreach (Shindler et al, 2009). Another study evaluating communication strategies revealed similar results where interactive methods – including interpretive centers, conversations with agency employees, elementary school programs, and guided field trips – were found to be more trustworthy and helpful than unidirectional methods, such as Smokey Bear, TV public service messages, brochures, special sections in newspapers, regular newsletters, and internet web pages (Toman et al, 2006). The only interactive method that had lower ratings unidirectional methods were government public meetings (Toman et al, 2006). Findings suggest that interactive methods that allow for more personalized interaction may be more successful in building trust and acceptance of prescribed fire.

A 2003 study assessed how knowledge and attitudes changed after participating in a hands-on learning program and found increased knowledge about fire management tools was associated with more positive attitudes towards fire management strategies (Parkinson et al, 2003). Another study

found that as focus group participants learned more about prescribed forest fires and the associated tradeoffs they expressed more tolerance for the practice (Weisshaupt et al, 2005). There is also research supporting the involvement of neighborhood organizations in education and outreach. Interviews with individuals in six WUI neighborhoods at risk of wildfire (including Anchorage, Alaska; Bastrop, Texas; Berkeley Township, New Jersey; Colorado Springs, CO; Ormond Beach, FL; and Spearfish, SD) found outreach through neighborhood organizations and active neighborhood leaders increased the effectiveness of the outreach the most (Shiralipour et al, 2006).

Another set of studies examined the role of mass media in prescribed fire outreach. One study found Florida residents became more knowledgeable and confident that prescribed fire would accomplish the goal of reducing fuel loads and risk of wildfire after reading informational booklets (Loomis et al, 2001). This survey shows that even mass produced educational materials can have a significant impact on levels of support. While mass produced materials may have the potential to increase knowledge of research on the topic of prescribed fire for a wide audience, another study showed that despite news articles that dispelled many of the misconceptions about prescribed fire, the public continued to hold onto the belief that prescribed fire posed large risks to wildlife and of fire spreading to nearby land; this was attributed to years of effective fire suppression messaging (Jacobson et al, 2001). Although news media has the advantage of reaching a wider audience because it is not personalized, it is limited in its capacity to tailor the message to specific local needs. Another study found mass media outlets such as newspapers and magazines have limited effect on attitudes and TV ads have negative associations (McCaffrey, 2004). Educational materials and personal contacts with forest management agencies increased risk perception, understanding and acceptance of prescribed fires and support for active homeowner involvement (McCaffrey, 2004).

Conclusion and Recommendations

This initial literature review of research on social perceptions toward prescribed fire provided a general overview of the research conducted across the U.S. Based on this review of social perceptions related to prescribed fire, we recommend the following key actions. We first recommend furthering this analysis by attaining an improved understanding of social perceptions toward prescribed fire specific to the Colorado Front Range. It is especially important to determine these perceptions with the 2012 wildfire season having been so active. Our understanding of local social perceptions can be improved by working with social scientists in the Front Range, as well as conducting additional reviews of existing research and popular press media. Second, this review should be expanded to broader forest management practices, as well as the CFLR program. Third, mechanisms for public outreach should be identified and put into place to establish improved public understanding and discussion of the FR-CFLRP.

The research reviewed reveals a complex set of factors that impact how individuals form opinions of forest management approaches. Although the majority of the research shows broad support for the use of prescribed fire, there is still a sizeable segment of survey respondents across studies that have major concerns related to the use of prescribed fire. Research, however, also shows there is potential to increase acceptance through education and outreach. Existing research highlights this is not a simple task. Not only do individual opinions vary based on location and forest context, but they also vary based on levels of trust and knowledge, experiences, and larger world views and belief systems. Considering the number of variables involved, it is important that forest managers take an approach to education and outreach that focuses on local conditions, history and context. Additionally, education tools should always take a more interactive approach so that the message and information can be tailored and adapted to personal concerns. Perhaps most importantly, education and outreach should seek to build and maintain high trust levels and confidence in forest managers as these are consistently rated as an important factor influencing support for prescribed fire.

Levels of Collaboration

Collaboration has been a key component of the Front Range Roundtable (FRR) since its inception in 2004. Interviews were conducted with 15 FRR members to develop a detailed assessment of the FR-CFLRP collaboration. The members interviewed indicated a diverse representation of interests have been involved with the FRR and/or the FR-CFLRP project monitoring.

A majority of the FRR members interviewed agreed the FR-CFLRP proposal fit well with the FRR collaborative goals because it was derived from the FRR's 2006 vision document, "Living with Fire: Protecting Communities and Restoring Forests". Since this document focused on both fire mitigation and forest restoration, the FRR was able to use the priority areas and recommendations identified for forest restoration in the CFLRP proposal. However, since the CFLR program focuses on National Forests some interviewees believe the FR-CFLR project has steered the FRR away from its broader scale restoration and mitigation efforts on non-federal lands, which makes up a significant amount of the acreage identified in the FRR vision document.

> FRR Interviewees:
>
> "I think it fits very well. …The proposal is specifically tied to restoration and hazard fuels mitigation in the same project area that the FRR has defined so I think it's 100 percent overlap with the FRR goals specific to treatments on national forest system lands."
>
> "I think there's a lot of similarity between the proposal and the FRR report but the CFLRP is specific to national forests and you'll see that the FRR report identified an awful lot of the problem on private land. And so the CFLRP is not capable of addressing that problem where it really largely exists."

Membership

Although the FRR membership is open to all interested parties and does not intentionally exclude any interests, approximately half of the interviewees identified key interests who are not currently involved or who have not been involved consistently with the FRR and/or the FR-CFLRP. Several were concerned about the inconsistent participation of some interests in the FRR and/or the

monitoring team affecting the decisions and implementation of the FR-CFLR project. Members believe that including these interests would benefit the process by providing additional perspectives. The missing interests that were identified included representatives from the forest industry (other than the contractor), local citizens, local government (e.g., elected officials, planners), insurance industry, additional conservation organizations, and sportsmen's groups (e.g., Rocky Mountain Elk Foundation). Other members felt the FRR science and monitoring team specifically needed a stronger representation of technical experts in the fields of watershed science, understory vegetation, social science, and wildlife. Nonetheless, many others felt there was a good diversity of interests represented in both the larger FRR and the FR-CFLRP science and monitoring team and that no interested parties were excluded from the process.

The majority believed the FR-CFLRP project has had a positive effect on relations among members. There has been increased engagement of FRR members and a diverse group of interests providing information to the monitoring efforts since the project was first proposed. This has provided an opportunity for members to actively work together and has "built new bridges that didn't exist in the past." It has improved relations among members of the FRR and the monitoring team through healthy debates and discussions.

Since the FRR has an open membership where those who want to be involved were already involved, some partners did not believe the FR-CFLRP project influenced relations between the FRR and other organizations. Most partners did feel that relations between the FRR and other organizations have been positively influenced by the FR-CFLRP project. It has increased the FRR's involvement with other CFLRP collaborative groups across the country, as well as with local organizations and experts the FRR had not coordinated with before. It has also improved working relationships between USFS research scientists and managers, increased involvement with local governments, and improved relationships with local landowners.

In addition, the level of trust among FRR members is relatively high, especially within the science and monitoring team. Nonetheless, several members identified a lack of trust in the Forest Service by a few of the FRR members. This was attributed to a lack of clarity in the process to develop and implement the FR-CFLR project (i.e., unclear sideboards) and recent events in which some members thought the project implementation conflicted with the planning documents or national CFLR program.

The majority of FRR members interviewed thought everyone had a high level of commitment and was willing to work toward agreement on important decisions related to the project. Although the monitoring team has had to address some conflicting priorities among some members there is a lot of good will and high levels of collaboration within the group where "everyone is working in good faith toward the resolution of hard decisions." Nonetheless, some mentioned the FR-CFLRP science and monitoring team members may be less willing to continue to work toward agreements if they do not see results of their efforts soon, or if a more formal decision-making process is not put into place.

FRR Interviewees:

"We're trying to move this (the FR-CFLR project) forward to meet a common objective."

"It has really strengthened the relationship between people on the (science and monitoring) team. … it's also made the relationship between the collaborators and the Forest Service more direct because we're having more interaction with them about specific projects and things on the ground. It's not so theoretical as it might have been once, its more, we're actually talking with them about what they're doing on the ground and going out to look at it and expecting some attention to be paid to what we're saying."

"It has created controversy too. Different stakeholders have different priorities, whether it is wildlife, understory, restoration, etc. Because the CFLR is a broadly worded act it does not specify what needs to be taken into account and this has created uncomfortable discussions where stakeholders say well the act says we need to do this but doesn't specify."

Process and structure

The FRR members were asked to discuss the FR-CFLRP project's collaborative monitoring process and structure. At the time of the interviews many members were unable to identify a formal process or clear parameters for the FR-CFLRP partners to make recommendations for implementation

and monitoring to the Forest Service. A clear process for the monitoring team to share decisions with the larger FRR collaborative group was also lacking for some members. Several members are frustrated because it is not clear how the FRR collaborative can influence or support the FR-CFLRP project by identifying treatment areas or commenting on the proposed projects because the final decisions rest with the Forest Service. Some members attributed this to a lack of agency leadership in defining the decision-making process and the role of the FRR collaborative in that process. A few expressed concern about a lack of clarity in how CFLRP funding decisions were being made in regard to implementation, monitoring, or project development. Frustration was also voiced about the development of sub-groups within the monitoring team because they believed it could create less accountability to the larger FRR.

Members of the larger FRR collaborative see their role as providing oversight and recommendations to the implementation and monitoring of the FR-CFLR project. In general, most monitoring team members see their role as contributing to the FR-CFLRP monitoring effort with each member having specific tasks outlined in the detailed work plan developed by the facilitator (Beh Management Consulting). Some members of the FRR science and monitoring team did not have a clear sense of their roles and responsibilities outside of the work plan.

FRR Interviewees:

"The CFLR group has more influence than they think [because] the Forest Service is open to getting input and if that was clear then the relationship between the Forest Service and other partners could be stronger. … I am hoping that when they move forward with new NEPA they [the FRR partners] will become more involved."

"Yeah, I think [members have a clear sense of their roles and responsibilities]. [The facilitator] is very good about assigning tasks to people so you know specifically that you're doing x, y and z."

"[W]e're supposed to come up with recommendations but there isn't a clear process for providing those recommendations or how decisions are made."

"[T]he FLRA refers to collaborative development and implementation but it's never been clear what that means vis-à-vis the FR-CFLRP. There's money that comes to the region that gets dispersed to the forests to do CFLRP work but there is, from what I can tell, no collaborative involvement in that decision-making process… once the forest has the money there's no collaborative involvement in how that money gets spent."

Communication channels

There was broad agreement that open and frequent formal communication has occurred across the FRR partners through email and quarterly meetings. There has also been open and frequent communication among monitoring team members through bi-weekly meetings, phone calls, and regular emails. Informal communication within the science and monitoring team has become much more frequent than among FRR members. Several people mentioned the FR-CFLRP project has significantly increased their involvement with other partners in the FRR. A few people were concerned about informal communications occurring among recently formed ad hoc sub-groups because these discussions may not include a diversity of interests and/or may not be relayed back to the larger science and monitoring team or the FRR overall.

FRR Interviewees:

"[There is] a lot of informal communications related to specific topics, but it's limited to a smaller group of people. I think there is collaboration within those [sub-] groups but it would be nice to have more cross pollination. There isn't a whole lot of communication among or between groups."

"There have also been a lot of good phone calls and good relations formed outside of the formal meetings and phone calls."

Implementation

There was overwhelming agreement that the FR-CFLRP project has re-energized the FRR because it has given them the opportunity to implement their objectives more fully through a targeted project, has helped to clarify the FRR's work, and has brought back partners who had become disengaged. Most members felt the FR-CFLRP project was on track to implement forest treatments on the specified acreage. A few members were frustrated by the implementation of projects that had been previously identified as hazardous fuels treatments and/or were associated with the Front Range long-term stewardship contract. Others expressed aggravation that the FRR collaborative has not had a larger role in determining the implementation goals of the FR-CFLRP project. In addition, the implementation

FRR Interviewees:

"It has given the FRR an opportunity to implement some of their goals more fully. Having funding has forced the FRR to implement projects. For a few years there was a lot of drifting, the FRR was lost beforehand. It became clear what to do with the CFLR and helped clarify the work."

"I think it has added focus. I don't think it's changed it. I think it's maybe given it a little bit of emphasis on the treatment areas and probably engaged them more in conversation than had been occurring prior to the CFLR project… [T]he CFLR project gave it a little focus or emphasis on, okay what does restoration really look like and… it gave something for the FRR to kind of coalesce on. And maybe engaged some members that had disengaged to a certain extent."

"Some argue that it put the focus of our work on a narrow slice of the overall FRR agenda. But it also breathed life back into the effort, and so I think we're better off with it than we were without it."

"[W]hen you have collaborative groups like that it really helps to actually have a tangible project on the ground. I've seen other collaboratives around the state really falter because they become nothing but a discussion group and people are really busy and so in my mind getting that grant has really given, they probably had purpose before, but it's a real purpose for the FRR. And in particular with the SM group. That's a great group. So, yeah I think it's changed it."

"We're driving the ship by committee and consensus and don't truly get anything resolved to the satisfaction of going forward and implementing."

of monitoring was not as far along as many had hoped it would be. Some attributed this to a lack of agreement among members on the desired restoration goals and methods to measure whether those goals were being met. The monitoring efforts are seen by many members as a work in progress where a few years of data collection are needed before it can be determined whether the treatments have met their intended goals.

Many partners agreed the collaborative was having an influence on the current implementation of the FR-CFLRP project by providing feedback and additional resources, as well as helping to shape future FR-CFLRP forest treatments. But many partners also found that the collaborative had little influence on the current implementation of projects because these projects had to be ready to go (i.e., project-level NEPA analysis completed) when the CFLR program funding came through.

FRR Interviewees:

"Monitoring is a work in progress; we're not there yet. We will need to collect data for a few more years to better understand the trends – if we're meeting the objectives and moving in the right direction."

"I don't feel at all part of the implementation goal… the collaborative really isn't part of the implementation."

"(Has the collaborative influenced the attainment of these goals?) Absolutely. I honestly believe that if we did not have the FRR, the acres treated across the Front Range would be nowhere near what they are today on the private or the public side. I think having the FRR being a voice to reach out to people, reaching out to county commissioners, fire district personnel, you know I think the collaborative being able to help ramp up the Woodland Park Healthy Forest Initiative all those things are truly resulting in more acres treated then if we did not have the FRR."

"It's disappointing that the CFLR funding just became a replacement funding source for the work that was already going on."

"The Forest Service is on track with implementation and monitoring. It's a different group of people than those who attend the FRR meetings."

"Because the projects had to be ready to go and it takes the Forest Service a long time to get these projects prepped, the collaborative wasn't really involved in setting up the projects that are being implemented this year. The Forest Service has learned from the collaborative and adjusted… but those changes are relatively minor in the large scale of things. So in a sense the Forest Service is learning from the collaborative but it's again implementing projects that were already ready to go."

Resources

Most partners agreed the current CFLRP resources were sufficient to implement the projects and monitoring programs. Nonetheless there was concern about limited resources for facilitation and coordination, research efforts and monitoring.

FRR Interviewees:

"We have the funding needed to implement the projects on the ground. Where I think we're falling short is on that research side and funds for monitoring."

"I don't think funding is a limiting factor I just think there are more proposals out there, there are more monitoring variables out there than we can practically get to as well."

"[S]o many people's budgets have been cut. I mean both federal and non-federal and it's a pretty big coordination effort to really be meaningfully engaged on this scale of a project. You know to stay on top of all the different pieces and then go out in the field and contribute to the research and the goals. Having a coordinator makes a big difference and our ability to support that coordinator is decreasing and I think that people's time as their budgets decline will also decrease so I think it's difficult."

Challenges and Recommendations

Evaluating the levels of collaboration provides a baseline understanding of the Front Range Roundtable and how the FR-CFLRP project has met expectations of membership, process and structure, communication, implementation, and resources.

Collaboration is a key component of the FRR. Interviews with several members indicated there has been a diverse representation of interests in the larger FRR and the FR-CFLRP science and monitoring team and that no interested parties have intentionally been excluded from the process. Most have found the FR-CFLRP project has had a positive effect on relations among members as well as relations between the FRR and other organizations. They reported relatively high levels of trust and strong commitments to work toward agreement on important decisions related to the project. This may be attributed to the open and frequent communication which occurs across the FRR partners and the monitoring team members. We recommend maintaining open communication and interactions to continue to facilitate strengthened relations and improved levels of trust across interests. Many partners agreed the collaborative was having an influence on the current implementation of the FR-CFLRP project by providing feedback and additional resources, as well as helping to shape future FR-CFLRP forest treatments.

The FRR has also faced some key challenges related to FR-CFLRP collaborative efforts. First, although the FRR membership is not restricted many members identified missing interests, including the forest industry, local citizens, local government, insurance industry, and additional conservation organizations. Some also felt the monitoring team needed greater representation of technical experts focused on watershed science, understory vegetation, social science, or wildlife biology. This challenge can be addressed by contacting key interests to invite them back to the table, to share information, and identify potential concerns and contributions they may have. Another challenge is that many members of the FR-CFLRP monitoring team do not have a clear sense of their roles or responsibilities. This was

attributed to not having a defined process by which the FRR collaborative supports or influences the implementation of the FR-CFLRP project, which frustrated many members. Some felt the FRR collaborative had little influence on the implementation of current projects because these had already gone through the required planning processes prior to proposal and funding of the FR-CFLRP project. This could be addressed by increasing the transparency of the process by discussing how the FRR and the monitoring team can provide recommendations, and clarify how implementation decisions are being made. Related to this, it may be helpful to further identify and delineate clear roles and responsibilities for the FRR and science and monitoring team members in the FR-CFLRP project. Third, there was some concern the FR-CFLRP may have steered the FRR away from work they were planning to do on non-federal lands. One potential method for addressing this concern and increasing the amount of work on non-USFS land would be to use the Good Neighbor Authority to coordinate work on neighboring lands. Regardless of these challenges, the members interviewed were optimistic about the collaborative effort and see the FR-CFLRP as a significant opportunity to achieve common objectives across diverse interests.

Appendix A – The Collaborative Forest Landscape Restoration Program

The Collaborative Forest Landscape Restoration (CFLR) Program was established by Congress under Title IV of the Omnibus Public Land Management Act of 2009. The primary purpose of the CFLR program is to support collaborative science-based restoration of priority forest landscapes, while encouraging ecological, social, and economic sustainability. It provides a mechanism to promote wood utilization as a way to offset treatment costs and to benefit local rural economies while improving forest health. It also promotes the reduction of wildfire management costs by reducing the risk of uncharacteristic wildfire and re-establishing natural fire regimes. This is meant to be accomplished by leveraging local, national and private resources. For additional information on the CFLR program see: http://www.fs.fed.us/restoration/CFLRP.

Appendix B – The Front Range Roundtable

The Front Range Roundtable is a coalition of representatives from state and federal agencies, local governments, environmental and conservation organizations, the academic and scientific communities, industry, and user groups. The convening force of this coalition is a commitment to forest health and fire risk mitigation along Colorado's Front Range. The Roundtable's focus area encompasses 10 Front Range counties: Boulder, Clear Creek, Douglas, El Paso, Gilpin, Grand, Jefferson, Larimer, Park and Teller Counties.

The Front Range Roundtable convened for the first time in May 2004. This precedent-setting meeting included representatives from 30 diverse organizations who wanted to engage communities and foster support for the implementation of forest management goals that help protect communities and restore forest health across all jurisdictions. Roundtable members also cultivated support for the work of the Front Range Fuels Treatment Partnership, an interagency partnership with the goal of reducing wildland fire risks through sustained fuels treatment. The Front Range Fuels Treatment Partnership was formed following the extensive 2002 fire season. During its first year, the Roundtable supported the Partnership by sharing information about accomplishments with important constituent groups and decision-makers.

A major collaborative accomplishment of the Front Range Roundtable was the development of the "Living with Fire: Protecting Communities and Restoring Forests" Vision Document in 2006. The Roundtable established four working groups with groups focused on community engagement, ecology, economics and policy. These groups developed information and data to foster discussion and support for the adoption and implementation of a Front Range vision focused on community protection and forest health. This vision document was the result of a rigorous, science-based process during which the FRR identified a 1.5 million acre area for treatment on Colorado's Front Range. This area consists of 400,000 acres where treatment is needed to both protect communities and restore forest ecosystems,

700,000 acres of treatment primarily for community protection and 800,000 acres in need of treatment to restore ecological conditions. Since the publication of this document the Front Range Roundtable has focused its efforts on promoting treatment on these collaboratively identified areas in need of treatment and on pursuing additional policy and economic solutions to ensure our goals can be accomplished.

After the Collaborative Forest Landscape Restoration Program was established under the Omnibus Public Land Management Act of 2009 the FRR partners were introduced to this opportunity and agreed to submit a proposal. A small sub-group of the FRR developed a draft proposal for the CFLRP using the 2006 vision document. The proposal was circulated to the full FRR for revisions and submitted by the Pike-San Isabel and Arapaho-Roosevelt National Forests. The Colorado Front Range Landscape Restoration Initiative was one of the first collaborative groups to receive a CFLR projects awarded in 2010. For additional information on the Front Range Roundtable see: http://frontrangeroundtable.org.

Appendix C – Methods

A key component of the FR-CFLRP proposal was to measure the socioeconomic impacts associated with the Front Range project. The socioeconomic monitoring component of the FR-CFLRP project was further developed through a multi-party monitoring effort after the proposal was accepted.

The initial multi-party monitoring plan identified five potential key goals of the socioeconomic monitoring: 1) enhance community sustainability; 2) improve local restoration business and workforce skills; 3) improve or maintain local quality of life; 4) improve capacity for collaboration; and 5) build support for forest restoration. Objectives related to these goals were later refined by the multi-party monitoring team to further develop the goals and indicators previously outlined. Implementation of the socioeconomic monitoring has been conducted by a collaborative team from the Forest Service's Rocky Mountain Regional Office (Julie Schaefers) and Washington Office (Kawa Ng) and the Colorado Forest Restoration Institute (Tony Cheng and Kathie Mattor).

The following sections outline the methods used by the socioeconomic monitoring team to measure the economic contributions, the levels of wood utilization, the levels of collaboration, and the social perceptions related to the FR-CFLRP project.

Economic Contributions Analysis

This analysis estimated the economic effects resulting from the implementation of CFRLP funded vegetation restoration treatments on the Pike-San Isabel, and the Arapaho-Roosevelt National Forests in 2011. The economic contributions to the regional economy in terms of employment, labor income and value added are estimated with an Input-Output model using primary data provided by the contractor. The following paragraphs briefly describe the estimation methodology and results.

Economic effects of the FR-CFLRP were analyzed in terms of employment, labor income and value-added resulting from vegetation restoration treatment activities on National Forest system lands. It was therefore important to model these effects from the amount of expenditures and labor actually

required to carry out the task orders[2] during the 2011 calendar year, instead of relying on the amount of funding distributed[3]. Pertinent operational expenditure and labor information was collected from the contractor to appropriately model the economic contributions using an Input-Output model. The contractor was provided with a list of questions, which were reviewed with the team and the contractor before and after providing expenditure and labor information (See Appendix D). These reviews helped the contractor better understand what information the team was requesting and how the results would be used, as well as helping the team understand how the contractor interpreted the questions and reported the information. Since the FR-CFLRP only utilized a single contractor to carry out vegetation treatment task orders, the results in this report have been aggregated to not disclose any detailed or sensitive information collected during the modeling process. Rather than assuming all expenditures for a project are incurred in the same location, the pertinent information collected to model inputs included the location (county) where task orders are performed, where operational expenses are incurred, and where labor hours and costs required for each task orders as well as non-labor expenses such as equipment and fuel are incurred.

The Input-Output Model

This analysis used Input-Output (I-O) modeling in order to estimate the economic effects of restoration activities. The U.S. Forest Service routinely uses I-O models to estimate local economic contributions of agency activities as part of the social and economic impact assessment in the

[2] "A 'Task order contract' means a contract for services that does not procure or specify a firm quantity of services (other than a minimum or maximum quantity) and that provides for the issuance of orders for the performance of tasks during the period of the contract." (U.S. Federal Acquisition Regulation (FAR), https://www.acquisition.gov/far/).

[3] Unlike the Colorado Front Range FY2011 report compiled by the National CFLRP team (available at: http://www.fs.fed.us/restoration/CFLRP/results.shtml#annualreports), which estimates the economic impact based upon the funding distributed, our analysis focused on detailed expenditure and operational data obtained from the contractor. Our analysis therefore focuses on just one component of the distribution of FR-CFLR funding. The calendar year was used because this is the method used by the contractors we obtained information from.

environmental impact assessment required by NEPA. The I-O model used in this analysis is built using IMPLAN® software and its 2010 county-level data. IMPLAN® (IMpact analysis for PLANing, Minnesota IMPLAN Group, Inc.) is a regional economic impact analysis system. It is capable of determining the extent to which a given activity such as logging, contribute to the local economy in terms of jobs, income, output and value-added. The model accomplishes this by tracing interactions among different sectors within the local economy and calculates the economic effects resulting from a direct impact on the economy. In this analysis, the direct impacts refer to both labor and non-labor operation expenditures incurred by the contractor.

Study Area

The first step in building the I-O model is to select the counties to be included (i.e. the Study Area). The relative size of the economy plays an important role in the estimate of contributions on jobs and income; include too many counties and the results may be washed out, include too few counties and the full impact of the activity may not be accounted for in the model area. The study area for this analysis includes only counties that were identified by the contractor as locations where vegetation treatment task orders/expenditures have occurred. This includes eleven counties in Colorado[4]:

Adams	Delta	Jefferson	Larimer
Boulder	El Paso	Fremont	Teller
Broomfield	Grand	Jackson	Weld

Calculating economic effects with the IMPLAN model

In order to estimate the economic effects of contractor expenditures, IMPLAN is used to generate "response coefficients" for a range of expenditure categories. Response coefficients, or more

[4] Delta county was also included via a method call MRIO (Multi-Regional Input-Output analysis), which allowed for linkage among non-contiguous counties in the same model.

intuitively 'the rates of economic activity', represent how that activity would ripple through the economy and impact employment and income levels. They are expressed in term of the impacts to jobs, income and value-added per a specified unit of an activity (for example the dollar amounts in final demand). Based on data collected from the contractor, seven categories[5] of response coefficients are generated[6]:

1. commercial and industrial machinery equipment (including repair and maintenance service),
2. petroleum refineries,
3. agriculture and forestry support activities (edited Industry Spending Pattern),
4. broadcast and wireless communications equipment manufacturing,
5. retail stores,
6. hand tool, and
7. other crop farming products.

In addition to the industry sector coefficients, four separate groups of response coefficients representing different household income groups were also generated using IMPLAN. These response coefficients are used to track how direct labor income (paychecks received by laborers hired by contractor) can be re-circulated through the household spending patterns causing further local economic activity. The groups are based on the estimated annual salaries for different types of workers in the contractor's firm, including office administration, project manager, forester, mechanic, trucking, manual hand crew, and equipment operator. Direct labor hour requirements for the task orders were also collected from the contractor, and were used to calculate the total direct jobs.

[5] The categories correspond to IMPLAN sectors which are based on NAISC (North American Industry Classification System) sectoring.

[6] Based on information collected from the contractor, additional adjustments have been made by editing the activities in IMPLAN in order to further refine the model. For example, if only a proportion of the expenditure occurred in the study area, the LPP (local purchase percentage) in the IMPLAN model is adjusted accordingly.

The Front Range Model

It should be noted that the economic impact estimates in this analysis contrasted with the estimates reported in the FY2011 CFLRP Annual Report (USFS 2012) due to differences in methodologies and data assumptions.

The FY2011 CFLRP Annual report employed an Excel-based tool called 'Treatments for Restoration Economic Analysis Tool' (*TREAT*) for its analysis of all CFLR projects (USFS 2010). The Excel tool *TREAT* relies on existing response coefficients from IMPLAN and therefore is also able to estimate jobs and income. *TREAT* was designed to streamline data entry and preparation for the generation of economic impact tables to be used in the CFLRP proposals. The goal for this tool is to assist teams with estimating the economic impacts of restoration activities while providing a standard approach during the development of CFLR project proposals (USFS 2010).

Since this social-economic analysis aims to serve as part of a monitoring reporting effort, *TREAT* was not used to complete this analysis. Instead, a customized IMPLAN model was built using data inputs from the contractors. This customized IMPLAN model will be referred to as *'The Front Range model'* henceforth. The following section highlights the major dissimilarities between *TREAT* and *The Front Range model*.

IMPLAN model study area: *The Front Range Model* was built using counties where contractor expenditures have occurred, with linkage to the county where office operation expenditures occurred via the Multi-Regional Input-Output (MRIO) modeling technique. *TREAT*, on the other hand, used counties where task orders are proposed to occur (excluding the contractor's home office county).

Model / data year: *The Front Range Model* is based on IMPLAN data from calendar year 2010 (the latest available), using contractor's expenditure information from calendar year 2011 as inputs. All figures

adjusted with GDP deflator. *TREAT* is based on IMPLAN data from calendar year 2009, while using the total awarded funding amount from fiscal year 2011 as inputs.

Economic impacts from matching funds and USFS employee salaries: *The Front Range Model* focused exclusively on impacts derived from CFLR funded task orders. *TREAT* on the other hand, included impacts derived from matching funds, as well as induced effects from USFS force salary by assuming a fairly substantial Forest Service FTEs allocated to CFLR responsibilities.

Modeling restoration activities: *The Front Range Model* obtained detailed expenditure and operational data from the contractor. These include the dollar amounts spent on various non-labor expenditures such as equipment maintenance or daily use rates, gasoline, office, tools, seeds and other operation costs. For labor, information on salaries and hours worked for different types of workers in the contractor's firm were collected, including office administration, project manager, forester, mechanic, trucking, manual hand crew, and equipment operator. Next, using the above information, analysis-by-parts modeling method was used to estimate impacts from various IMPLAN sectors. The *TREAT* model begins with the total awarded funding amount, and then estimates the impacts to the logging and supporting forestry sectors, by proportioning a percentage of the award that is going to be used for contracted work by Regional firm(s).

Impacts from Wood utilization: A detailed account on the amount and types of materials removed by task orders, as well as the number and location of businesses purchasing these forest product materials was provided in this report (see the 'Wood Utilization Analysis' section). Since we were unable to obtain data on the volume of timber harvested in terms of CCF/MBF/dry ton for calendar year 2011, we did not use *The Front Range Model* to identify the economic impacts from forest products. Nevertheless, *TREAT* was able to estimate the jobs and income effects from forest products, by assuming that over six thousand CCF (cubic feet) worth of saw timber entered the regional economy in 2011.

Conclusion

It is worth noting that both methods utilized IMPLAN at one point during the analytical process and that any multipliers IMPLAN produced are simply projections of impacts from various economic activities based on static models. While a genuine attempt at modeling the impacts from implementation (actual expenditures and labor entering the economy as outlined in this *Front Range Model)* should be taken at the project monitoring stage rather than projecting impacts from the total funds awarded, it is evident that the customized *Front Range Model*, constructed using expenditure data from the contractor, required greater commitments of time and effort. Considering these increased commitments, *TREAT* is by far a more streamlined and easy-to-use tool based out of Excel. *TREAT* is unquestionably the tool of choice when the extra effort of a customized model (such as *The Front Range Model*) proves unwarranted given the time, budget and expertise constraints being faced.

References

USDA Forest Service (USFS). 2010. Treatments for Restoration Economic Analysis Tool: User Guide. *An internal technical guide*. United States Forest Service.

USDA Forest Service (USFS). 2012. Front Range CFLRP Annual Report, FY2011. Available online at: http://www.fs.fed.us/restoration/CFLRP/ (last accessed October 25, 2012).

Wood Utilization Analysis

The goals of the wood utilization analysis were to:

1. Identify the types of materials taken off of the National Forest according to the FR-CFLRP vegetation treatment task orders.
2. Determine the number and location of businesses purchasing these forest product materials.
3. Identify the types and values of wood products produced.

The contractor was provided with another list of questions, which was reviewed with the contractor and the team before and after providing information (See Appendix E). These reviews helped the contractor better understand what information the team was requesting and how the results would be used, as well as helping the team understand how the contractor interpreted the questions and reported the information. The data from the contractor was then compiled and analyzed using basic statistical analyses.

Social Perceptions

The social perception of forest treatments, specifically prescribed fire, were identified through a review and synthesize of existing social science research studying public beliefs and acceptability with regards to mechanical and prescribed fire forest vegetation treatments. Social perception research relies on information from two primary populations:

1. The general public - gathering information about their general knowledge and preferences toward mechanical treatments and prescribed burning.

2. Local residents/homeowners within the wildland-urban interface (WUI) – gathering information about their general knowledge of defensible space and attitudes toward risk.

Thirty pertinent articles (Appendix G) focused on perceptions of prescribed fire by both populations were identified to gain an improved understanding of current trends in social perceptions of prescribed fire in forest management. This literature was reviewed and the common themes and general finding were compiled.

Levels of Collaboration

An assessment of the levels of collaboration being used during the planning, implementation, and monitoring of the FR-CFLRP was also conducted. The specific objectives were to:

1) Assess the level of collaboration associated with the FR-CFLRP project.

2) Identify challenges and accomplishments of FR-CFLRP projects.

3) Document lessons learned.

Interviews were conducted, rather than a broader survey so a deeper understanding of this collaborative process could be established. The interview questions were developed from the draft collaboration survey developed through the CFLR national indicators workshop sponsored by the National Forest Foundation in June 2011. The questions focused on the collaborative process, group membership, the development and the impacts of the FR-CFLRP project on the FRR collaborative group (Appendix F).

A total of 27 potential interviewees were identified through key informants and the Front Range Roundtable contact list. Fifteen interviews were conducted with a variety of FRR members to assess the CFLR membership characteristics, the collaborative process and group structure, communication

channels, implementation, and resource availability. The people interviewed represented a diversity of interests including the US Forest Service and other federal management agencies, state agencies, local and national environmental conservation organizations, academic institutions, and research organizations. The interviewees consisted of a fair representation of both longer-term and more recent members of the FRR with four original FRR members, four longer-term FRR members, and seven more recent members who have joined the FRR since fall 2010. The interview data was transcribed and compiled, which allowed for a thorough qualitative analysis of the levels of collaboration associated with the development and implementation of the FR-CFLRP project.

Appendix D –

Economic Impacts of Restoration: Questions for Contractors

1. **Name of the restoration site and the project(s) you worked on:**
   Please list all task orders associated with CFLR during calendar year 2011
   (if more than one forest, please indicate; add more lines as needed)

Forest 1:_____	Ranger District	County	Mechanical Acres	Manual Acres	Date signed	Date started
Project	*_____Ranger District*		###	###		
____ NF Total			_____	_____		

2. **Check if you are responding for all of the work conducted on the restoration site or for specific site-related project(s) within a restoration site:**

   _____ Entire restoration site
   _____ Site-related restoration project(s)

3. **Site/project(s) and firm location:**
   Use the following table to list the location of the site/project(s) that you worked on and any off-site locations for your firm that worked on ***this restoration site/project(s)***. If there are more than two off-site locations, please choose the top two locations.

Site/Project(s) Location	State	County
Off-site Location 1		
Off-site Location 2		

4. **What type of restoration work did this site/project(s) include *(check all that apply)*:**

_____Ag/grazing	_____Bird habitat/populations
_____Air quality	_____Fish habitat/populations
_____Fresh surface water	_____Mammal habitat/populations
_____Groundwater	_____Reptile/amphibian habitat/populations
_____Sediments	_____Other_____
_____Shoreline	_____Other_____
_____Wetland/marsh	_____Other_____
_____Woodland/forest	_____Other_____

5. **Did the site/project(s) have any chemical disturbance (e.g. oil spill, Superfund site)?**

_____Yes
_____No

6. **Which of the following roles did your firm play in this restoration project *(check all that apply)*:**

_____Project management	_____Other project implementation
_____Management consulting	_____Monitoring
_____Restoration planning/design	_____Product vendor
_____Site Surveying	_____Other_____
_____On-site construction	_____Other_____

7. **Please describe your role in the project:**

8. **Subcontracting:**

   a. **Did you contract out any tasks to subcontractors? Yes_____ No_____**

   b. **If yes, please provide:**
      i. **the name(s) of the subcontractor(s):**
      ii. **a description of the work performed by the sub-contractor(s):**
      iii. **where the sub-contractor(s) are based:**

   c. **If necessary, can we have your permission to contact the subcontractor(s)? If yes, please provide the appropriate contact information.**

9. Direct employment for this project:

Please indicate the total number of labor hours (including employees and managers) that worked on ***this restoration site/project(s)*** in each location (please refer to the locations identified in Question #2)***.***

Task Order	Number of **Acres completed** for this task order:	Number of labor hours for employees working primarily at the **Site/Project(s) Location:**	Number of labor hours for employees working primarily at **Off-Site Location 1:**	**Total** number of labor hours for this restoration project:
				(Sum)
Total:				

a. Do the above labor hours include work done by subcontractors?

_____Yes
_____No

b. If yes, what is the total number of labor hours billed by the subcontractor(s)? _____

10. Overall breakdown of costs:

Use the following table to identify the percent split between labor and non-labor costs for **this restoration site/project(s)**. Labor costs include benefits, wages, and proprietor's income. Non-labor costs include all other expenses including overhead, administration and subcontracting.

Expenditure Category	**% of total site/project(s) cost**
Labor Costs	
Non-Labor Costs	
	100%

11. Breakdown of non-labor costs:

Use the columns in the table below to answer the following two questions about non-labor expenses for ***this restoration site/project(s).*** If you are unable to provide exact percentage breakdowns, please use your professional judgment to provide best-known estimates.

Column 1:	What percentages of total non-labor expenses were spent on the following types of expenses for this project? This column should add to 100%.
Column 2:	What percentages of these non-labor expenses were purchased within the local area surrounding the project location? ***(Note: the local area is defined as a reasonable commuting distance)*.**
***Note:**	Equipment refers to durable goods such as vehicles and machinery. Materials refer to goods purchased as inputs specifically for this project (e.g. gravel, fencing, office supplies, etc.)

Non-Labor Costs	**Column 1** Percentage of total non-labor expenses:	**Column 2** Percentage expended within the local area surrounding the site/project(s) location:
Equipment rental / leasing / daily use rates		
Equipment maintenance and repair		
Materials		
Travel		
Overhead /Administration		
Other (please describe)		
	100%	

12. Breakdown of travel costs:

If you had travel costs for this project, use the columns in the table below to answer the following two questions about travel expenses for ***this restoration site/project(s)***. If you are unable to provide exact percentage breakdowns, please use your professional judgment to provide best-known estimates.

Column 1:	What percentages of total travel costs where spent on the following types of expenses for this project? This column should add to 100%.
Column 2:	What percentages of these non-labor expenses were purchased within the local area surrounding the project location? ***(Note: the local area is defined as a reasonable commuting distance)*.**

Travel Costs	**Column 1** Percentage of total travel costs:	**Column 2** Percentage expended within the local area surrounding the site/project(s) location:
Per diem		
Car/truck rental (for travel)		
Gas (for travel)		
Other (including airfare)		
	100%	

13. Breakdown of materials costs:

Please use the table on the following page to indicate the types of materials used for ***this restoration site/project***. Place a check mark next to all materials that were used in the project. **Please complete columns 1 and 2 *only* for the materials used in the project.**

Column 1: Please indicate the percent of total material costs spent on each material. This column should add to 100%. If you are unable to provide exact percentage breakdowns, please use your professional judgment to provide best-known estimates.

Column 2: Please use the check boxes to indicate if the material was purchased from a retailer.

Materials	**Column 1** Percentage of total materials cost:	**Column 2** Purchased from a retailer? **Yes**	**No**
___General retail merchandise (e.g. food, clothes, work gloves)		☐	☐
___Office Supplies		☐	☐
___Gasoline		☐	☐
___Tools and Parts (for equipment and vehicles)		☐	☐
___Seeds		☐	☐
___Communications equipment		☐	☐
___Other_____		☐	☐
___Other_____		☐	☐
___Other_____		☐	☐
___Other_____		☐	☐
	100%		

14. **Breakdown of labor costs:**

What percentage of total labor costs (direct wages and non-payroll) typically go to the following types of workers? The column should add to 100%.

Type of Worker	**Percentage of total labor costs that go to labor for the following worker types:**
Project Managers	
Forester/ Biologists/ecologists/other	
Engineers and other planners/designers	
Mechanics	
Administrative Staff	
Machine and equipment operators	
Truck drivers	
Manual laborers	
Technicians	
Others (please describe)	
Others (please describe)	
	100%

Appendix E – Wood Utilization Survey

1. **Name of the restoration site and the project(s) you worked on:**
   Please list all task orders associated with CFLR during calendar year 20___
   (if more than one forest, please indicate; add more lines as needed)

Forest 1:_____	Ranger District	County	Mechanical Acres	Manual Acres	Date signed	Date started
Project	*_____Ranger District*		###	###		
____ NF Total			_____	_____		

2. **What percentage of the total amount of material harvested is:**

   ***Manual* (out of 100%)**

   a. Available for value-added use? _____%

   b. Piled and burned (not for prescribed burn) _____%

   c. Left for wildlife habitat? _____% or _____ tons/acre

   ***Mechanical* (out of 100%)**

   a. Available for value-added use? _____% (Sawtimber, POL and biomass)

   b. Piled and burned (not for prescribed burn) _____%

   c. Left for wildlife habitat? _____% or _____ tons/acre

3. **How many businesses purchase material from you (specifically related to this project)?**

Forest 1: _____ (Copy for additional forests)

a. Total businesses: _____

b. Colorado businesses: _____

c. Other states: (please specify state and number of businesses): _____

Overlap?

If there are two or more forests associated with this project, are there any businesses that purchase from multiple forests? If yes, how many businesses? _____

4. **What types of materials did you sell from the restoration site and project(s)? Where did these materials go?**

Forest 1: _____ (Copy table for additional forests)

Materials Sold			**Locations material was sold to:** (please identify locations)		
	Amount (Green Tons)	The county the project was located in	County in CO	State outside of CO	County outside of CO (if available)
Sawtimber *(Specs? _____)*					
Small diameter timber *(Specs? _____)*					
Blue stain					
Products other than logs (POL)					
Limbs/ brush					
Bark Fines					
Other *(please specify):*					
Total:					

5. **What percentage of the materials removed from the site went to each category of products? Where are the purchasers located? What is the value of the product?**

Forest 1: _____ (Copy table for additional forests)

Products created	**Column 1** Percent of total material sold:	**Column 2** Product Value (low, medium, high)	**Column 3** Locations material was sold to: (please specify location and percentage across row)				
			The county where the project was located:	Other county in CO:	State outside of CO:	County outside of CO:	
example: firewood	*10%*	*Low*	*Larimer, 5%*	*Moffat, 2%; Montrose 3%*	*n/a*	*n/a*	*100%*
Wood Fuel Pellets							100%
Biomass Electricity							100%
Firewood							100%
Pallets & Crates							100%
Dimensional lumber							100%
Logs - log homes							100%
Logs - other							100%
Beams & Timbers							100%
Trusses							100%
Posts/ poles							100%

Products created (continued)	**Column 1** Percent of total material sold:	**Column 2** Product Value (low, medium, high)	**Column 3** Locations material was sold to: (please specify **location** and **percentage** across row)				
			The county where the project was located:	Other county in CO:	State outside of CO:	County/ town outside of CO:	
Flooring & Paneling							100%
Doors							100%
Windows							100%
Veneer							100%
Custom Cabinets							100%
Mass produced cabinets							100%
Mass produced furniture							100%
Custom furniture							100%
Siding & Decking							100%
Molding							100%
Holiday trees & transplants							100%
Paper products							100%

Products created (continued)	**Column 1** Percent of total material sold:	**Column 2** Product Value (low, medium, high)	**Column 3** Locations material was sold to: (please specify **location** and **percentage** across row)				
			The county where the project was located:	**Other county in CO:**	**State outside of CO:**	**County outside of CO:**	
Shavings							100%
Soil Fertilizer/ Biochar							100%
Animal Bedding							100%
Landscape ties							100%
Chips							100%
Mulch							100%
Compost							100%
Fencing							100%
Other - specify							100%
	100%						

Appendix F – Interview Questions

1. **From your personal involvement, could you provide a brief description of the history of the __*(group's name)*__?**
    a. What was your role? When and how were you involved in the collaboration?

2. **Could you describe the development of the _*(group's name)*__CFLR project proposal?**
    a. How did the proposal fit with the collaborative group's goals?
    b. Did the CFLR project change the goals and focus of _*(group's name)*__?

3. **How has the CFLRP influenced the _____?**
    a. How has it changed relations among members? (internal relations)
    b. How has it changed relations b/w _____ and other organizations? (external relations)
    c. How has it changed the capacity of the group? (Do you have more/less resources? Are you able to leverage more/less resources?)

4. **How collaborative has the CFLR project been?**
    a. *(membership)* Are all the interests who should be involved, involved? To what extent do all the interests involved in the CFLR trust one another? Are CFLR members willing to work toward agreement on important decisions related to the project?
    b. *(process/ structure)* Do members of the CFLR have a clear sense of their roles and responsibilities? Is there a clear process for making decisions among the partners of this CFLRP? How would you gauge the CFLRP partners' level of commitment overall?
    c. *(communication)* Is there open and frequent communication among CFLRP partners, both formal and informal? Explain.
    d. *(implementation)* To what extent is the CFLRP collaborative reaching its implementation goals? Has the collaborative process influenced the attainment of these goals? If so, how?
    e. *(resources)* Does the CFLRP collaborative have sufficient resources to accomplish its goals (funding, staff, materials, time, and leadership)?

5. **Any lessons learned you would like to share with future CFLR collaboratives? (major challenges, opportunities, etc.)**

Appendix G – Social Perceptions Bibliography

Absher J.D. Vaske JJ. "Predicting Wildland Fire Policy Support." 2006 Prepared for the USDA Forest Service, Pacific Southwest Research Station, Riverside, CA and the Department of Natural Resource Recreation and Tourism, Colorado State University, Fort Collins, Colorado. www.fs.fed.us/pnw/pubs/pnw_gtr688/papers/Sci%20&%20Pol/session2/Absher.pdf.

Absher JD. Vaske J.J. "Ipsative Crystallization Effects on Wildland Fire Attitude-Policy Support Models." *Society and Natural Resources.* 2006. 19: 381-392.

Ascher, Timothy. "Factors Influencing Support for Prescribed Burning and Mechanical Thinning Among Wildland-Urban Interface Residents in the Lake Tajpe Basin." Ohio State University. 2010.

Bright, Alan D., Newman, Peter, Carroll, Joshua "Context, Beliefs, and Attitudes toward Wildland Fire Management: An Examination of Residents of the Wildland-Urban Interface". *Human Ecology Review*, Vol. 14, No2, 2007. 212-222.

Bright, Alan, Newman, Peter. "How Forest Context Influences the Acceptability of Prescribed Burning and Mechanical Thinning." *The Public and Wildland Fire Management: Social Science Findings for Managers*. November, 2006. 47-52.

Brunson, Mark W., Evans, Jessica. "Badly Burned? Effects of an Escaped Prescribed Burn on Social Acceptability of Wildland Fuels Treatments." *Journal of Forestry*. April/May 2005. 134-138.

Brunsen, Mark W., Shindler, Bruce A. "Geographic Variation in Social Acceptability of Wildland Fuels Management in the Western United States." *Society and Natural Resources.* 2004. 17: 661-678.

Cacciapaglia, Michael A.; Yung, Laurie; Patterson, Michael E. "Place Mapping and the role of spatial scale in Understanding Landowner Views of Fire and Fuels Management. *Society and Natural Resources*. 2011. 0:1-15.

Jacobson, Susan K., Monroe, Martha C., Marynowski, Susan. W*ildlife Society Bulletin.* 2001. 29(3). 929-937.

Liou, Gwo-Bao, Vogt, Christine, Winter, Greg, McCaffrey, Sarah, "Residents' Values and Fuels Management Approaches." *Proceedings of the 2007 Northeastern Recreation Research Symposium*. 2007. 77-83.

Loomis, John. Bair, Lucas. Gonzalez-Caban, Armando. "Prescribed Fire and Public Support: Knowledge Gained, Attitudes Changed in Florida." *Journal of Forestry*. November, 2001. 18-22.

Manfredo, Michael, Fishbein, Martin, Haas, Glenn and Watson, Ian. “Attitudes Toward Prescribed Fire Policies: The public is widely divided in its support.” *Journal of Forestry.* July 1990. 19-23.

McCaffrey, Sarah M. “Fighting Fire with Education: What is the Best Way to Reach Out to Homeowners?” Journal of Forestry. July/ August 2004. 12-19.

Olsen, Christine, Shindler, Bruce A. “Trust, Acceptance and citizen-agency interactions after large fires: Influences on Planning Strategy.” International Journal of Wildland Fire. 2010. 19, 137-147.

Parkinson, Tamara M., Force, Jo Ellen, Kapler-Smith, Jane. “Hands on Learning: Its Effectiveness in Teaching the Public about Wildland Fire.” Journal of Forestry. October/November, 2003. 21-26.

Ryan, Robert, Blanchard, Brian, Wamsley, Mark. “Residents Warming Up to Fuels Management: Homeowners’ acceptance of Wildfire and Fuels Management in the wildland-Urban Interface.” *The Public and Wildland Fire Management: Social Science Findings for Managers*. November 2006. Pg.11-17.

Shindler, Bruce A.; Toman, Eric; McCaffrey, Sarah M. “Public Perspectives of Fire, Fuels and the Forest Service in the Great Lakes Region: A survey of citizen-agency communication and trust.” *International Journal of Wildland Fire*. 2009, 18, 157-164.

Shindler, Bruce A., Toman Eric, McCaffrey, Sarah M. “Public Perspectives of Fire, fuel and the Forest Service in the Great Lakes Region.**”** *International Journal of Wildland Fire. 2*009, 18 157-164.

Shindler, B. A., Toman E., McCaffrey, S. M., Mallon, A., Bennett, J., Frederick, S.S. “Longitudinal Analysis of Wildland Fire and Fuel Management: Examining Citizen Responses in Seven States from 2002-2008.” Joint Fire Science Project (06-4-1-26).

Shiralipour, J.H. Monroe, M. Nelson, K.C. Payton, M. 2006. “Working with Neighborhood Organizations to promote Wildfire Preparedness”. The Public and Wildland Fire Management. 151-162.

Toman, Eric, Stidham, Melanie, Shindler, Bruce, McCaffrey, Sarah. “Reducing Fuels in the Wildland- urban Interface: Community Perceptions of Agency Fuels Treatment” International Journal of Wildland Fire. 2011, 20, 340-349.

Toman, Eric, Shindler, Bruce, Brunson, Mark. “Fire and Fuel Management Communication Strategies: Citizen Evaluation of Agency Outreach Activities.” Society and Natural Resources, 2006. 19:321-336.

Toman, Eric, Shindler, Bruce, Reed, Michelle. “Prescribed Fire: The Influence of Site Visits on Citizen Attitudes.” The Journal of Environmental Education. Spring 2004, Vol. 35, no 3. 13-17.

Weisshaupt, Brad R., Carroll, Matthew S., Blatner, Keith A., Robinson, William D., Jakes, Pamela J. “Acceptability of Smoke From Prescribed Forest Burning in the Northern Inland West: A Focus Group Approach.” *Journal of Forestry*. June 2005. 189-193.

Winter, Gregory, Fried, Jeremy. “Homeowner Perspectives on Fire Hazard, Responsibility, and Management Strategies at the Wildland Urban Interface.” Society and Natural Resources. Vol 13 (1), 2000. 33-49.

Winter, Gregory, Vogt, Christine, Fried, Jeremy. “Fuel Treatment at the Wildland Urban Interface: Common Concerns in Diverse Regions.” *The Journal of Forestry.* January 2002. *1*5-21.

Winter, Greg. Vogt, Christine. McCaffrey, Sarah. “Examining Social Trust in Fuels Management Strategies”. Journal of Forestry. September 2004. 8-15.

Winter, Gregory. Vogt, Christine. Fried, Jeremy. “Demographic and Geographic Approaches to Predicting Public Acceptance of Fuel Management at the Wildland Urban Interface.” University of California, Berkeley ESPM-RIPM, College of Natural Resources Berkeley, CA. September 2002.

Winter, Greg. Vogt, Christine. McCaffrey, Sarah. “Residents Warming Up to Fuels Management: Homeowners’ Acceptance of Wildfire and fuels Management in the Wildland-Urban Interface. *The Public and Wildland Fire Management: Social Science Findings for Managers*. November 2006. 19-32.

Vaske, Jerry. Bright, Alan. Absher, James D. “Salient Value Similarity, Social Trust and Attitudes Toward Wildland Fire Management Strategies.” *Fire Social Science Research From the Pacific Southwest Research Science Research From the Pacific Southwest Research Station: Studies Supported by National Fire plan Funds*. 2009. 233-251.

Vogt, Christine. Winter, Greg. Fried, Jeremy. “Antecedents to Attitudes Toward Prescribed Burning, Mechanical Thinning and Defensible Space Fuel Reduction Techniques. 2002. www.fire-saft.net/docs/fsbookpaper.pdf.

Vogt, Christine, Fried, Jeremy, Winter, Gregory. “Predicting Homeowner Approval of fuel management at the Wildland-Urban Interface using the Theory of Reasoned Action.” S*ociety and Natural Resources*, 2005 18:1-18.