Socioeconomic Indicators for Forest Restoration Projects

Andrew Egan and Vicky Estrada-Bustillo

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Andrew Egan, Director
New Mexico Forest and Watershed Restoration Institute

Vicky Estrada-Bustillo
Estrada Collaborative Resource Management, LLC

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Forward

Forest restoration in the southwestern United States lies at the intersection of forest health, rural economic development and wildfire prevention. Critical to restoration efforts is the ability to evaluate their effectiveness, especially as they relate to improvements in social and economic conditions of stakeholders and local communities.

This report, developed by the New Mexico Forest and Watershed Restoration Institute through a grant from the USDA Forest Service, Southwest Region, will help us better understand the social and economic outcomes of forest restoration projects. Importantly, it provides a framework for assessing the contributions of forest restoration efforts to local economies and restoration-based businesses.

Ben Ray Lujan
Congressman NM-03

Contents

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Abstract

A model for assessing the socioeconomic outcomes of forest restoration projects was developed. Using a form of purposive sampling, eleven experts with backgrounds in the social, economic, and business aspects of forest restoration were identified and agreed to participate in the process. Four iterations of a Delphi process resulted in a practical, robust model capable of evaluating the social and economic effects and outcomes of a wide range of forest restoration projects. Among the most highly rated indicators in the model were those related to job creation, community stability, economic impacts, and collaborative participation in restoration processes. The relative importance of the indicators was estimated, and specific metrics were developed for each indicator in the model. Upon completion of the Delphi process, the model was discussed with forest restoration monitoring practitioners and stakeholders, who offered their perspectives from practitioners' points of view. Results may have implications for any forest restoration efforts with an interest in assessing a project's social and economic outcomes.

Introduction

The Collaborative Forest Restoration Program (CFRP) was initiated in 2001 by the USDA Forest Service (USFS) as a new approach to building agreement among people and organizations that care about New Mexico's forest land, by awarding grants that restore forests on public and tribal lands and improve the use of small-diameter trees thinned from those lands. Important program objectives also include reducing the threat of catastrophic wildfire and creating local employment and training opportunities. While some core ecological indicators have been developed and widely used to evaluate the effectiveness of CFRP and other on-the-ground restoration projects, efforts to systematically develop and apply indicators related to the social and economic outcomes of CFRP projects have been limited.

The first formal effort directed at identifying socioeconomic indicators for the CFRP was undertaken in 2003 through a series of workshops, from which a set of six handbooks was created. Handbook Five was dedicated to socioeconomic goals and indicators and provided monitoring design and data collection methodologies (Derr et al. 2005). To achieve their objectives, Derr et al. (2005) used a multiparty group of researchers, land managers and community members to develop social and economic goals for CFRP projects, including enhancing community sustainability, building restoration businesses, and improving local quality of life. While it is unclear whether indicators consistent with these goals were derived by the multiparty group or through some other mechanism, the authors did suggest ways to better understand and document how these goals might have been achieved through CFRP project implementation. For example, among the suggested ways of evaluating a project's effects on local quality of life were: total number of workers employed by the project; number and type of restoration-related trainings completed by project workers; and type of harvesting equipment used.

Later, to meet the needs of grantees requiring more simplified monitoring protocols with fewer indicators, the Short Guide for (CFRP) Grant Recipients (Moote et al. 2008) recommended five indicators of social and economic change (p. 16): jobs created, skills gained, value of wood products generated, outreach and education, and community perception. An assessment of jobs created and skills gained is required by all CFRP grantees. Social science methods, such as questionnaires, interviews and focus groups, were also discussed. However, the processes that led to the development and assessment of the socioeconomic indicators recommended in the Short Guide are unclear.

In 2008, the USFS charged the New Mexico Forest and Watershed Restoration Institute (NMFWRI) to convene a group to review the socioeconomic monitoring information collected by grantees during the first seven years of the CFRP to (a) assess results of socioeconomic monitoring and (b) identify any needs and opportunities for improving the socioeconomic monitoring program and its impact (Estrada et al. 2009). The group found that, while many project grantees were monitoring some of the same indicators (e.g., the number and kinds of jobs created), the measures used to assess the indicators were so varied that it was difficult to compare information across projects. Less than half of the projects included assessments related to value of wood products, education outreach and community perceptions. Additional challenges included project-to-project variability in grantees' abilities to effectively assess socioeconomic project outcomes. Moreover, Estrada et al. (2009) found that indicators not included in the Short Guide were also being monitored. The authors recommended that additional indicators be identified that addressed business operations, collaboration, and wood utilization. In addition, it was suggested that more targeted monitoring occur that demonstrated progress toward project-specific goals, such as utilization, planning, and restoration-based business and infrastructure development. The need for standardized protocols for collecting and evaluating socioeconomic monitoring data across CFRP projects was later reiterated by Derr and Krasilovzky (2009).

Objectives

The objectives of our study were:

- To systematically and objectively develop assessable, core social and economic indicators that can be monitored during forest restoration projects;
- To devise a robust model for assessing socioeconomic outcomes of restoration projects at several levels of restoration project objectives and resource availability;
- To develop an approach and model that was defensible on both practical and scientific levels; and
- To refine the Delphi-derived metric and model for use by the CFRP.

Attention to and convergence of these objectives was critical to developing a practical assessment tool, since restoration project managers and personnel may cover a wide range of backgrounds and levels/areas of expertise – and, perhaps consistent with that, restoration efforts often cover a wide range of project objectives, including: investments in restoration-related equipment/infrastructure; training/education; community involvement and outreach; restoration planning; mitigation of catastrophic wildfire potential; and improving forest health. In addition, time, resources and expertise available to implement forest restoration projects can vary significantly. Moreover, some restoration projects are implemented at the forest or stand level, while others are implemented across multiple jurisdictions and landscapes.

Methods

Overall, this project incorporated a Delphi process and post-Delphi focused discussions to achieve its objective of systematically developing socioeconomic indicators for forest restoration projects. Chronologically, during the ten-month project period, the process included:

- A Delphi process
    - o Purposive sampling to select Delphi experts
    - o An iterative Delphi process
    - o Model and metric development
    - o Delphi process and model evaluation
- Post-Delphi focused group discussions

Delphi Process

In the early 1950s, Olaf Helmer of the Rand Corporation conducted a forecasting study sponsored by the U.S. Air Force. In

that investigation, seven experts were asked their opinion of the probable effects of strategic bombing of industrial sites in the United States during a hypothetical conflict with the Soviet Union in 1953 (Dalkey and Helmer 1962). Participants were unaware of the identity of other experts. The process spanned a period of five weeks, during which a succession of five questionnaires and controlled feedback occurred. Participants were given the opportunity to modify their responses based on the summarized responses of all seven experts. The process concluded when significant convergence of opinion was achieved.

The iterative process of questions, controlled feedback, response modification, and consensus – framed by participant anonymity – has generally been referred to as the Delphi process (Helmer and Rescher 1960). Since its genesis with Helmer's work, Delphi methods have been used by many investigators, first in the area of forecasting and, later, more broadly applied to a variety of problem-solving situations for which little or no baseline information was available. In forest science, Delphi processes have been used to develop baseline information and metrics used in forest recreation (Shafer et al. 1974), wildlife habitat (Schuster et al. 1985), abiotic influences on forests (de Steiguer et al. 1990), forest science planning (Gregersen et al. 1990), timber harvesting (Egan and Jones 1997; Egan et al. 1995), and forest roads (Egan et al. 1996).

The anonymity component of the process eliminates the effects of overly assertive or influential members of the expert panel. Expert opinion, therefore, is considered independent and influenced only by each participant's expertise and by controlled, objective feedback. The qualitative nature of the descriptive information often derived from evaluation processes provides depth of detail not easily achievable through more quantitative methods (Patton 1980). The process also avoids the logistical and budgetary challenges associated with bringing experts together in one place at one or more times. Although analysis and synthesis of Delphi expert input is made difficult in the absence of parsimonious and easily aggregated quantitative data, capturing an expert's point of view without it being either constrained by or predetermined through prior selection of analysis categories can add depth and detail to expert inputs.

Consistent with the history and protocols associated with Delphi processes, we viewed our job as facilitating a conversation among experts who were anonymous to each other by soliciting their thoughts in an iterative process of e-mailed questions, controlled feedback, response modifications, and consensus.

Selecting the experts. Eleven Delphi experts were identified using snowball sampling – a nonrandom, purposive approach designed to recruit recognized experts from the pool of acquaintances of other recognized experts (Appendix). Expert selection criteria included a background in natural resources, preferably in forest restoration; familiarity with CFRP goals, objectives, and implementation; and broad recognition as an expert/opinion leader in social, economic and/or forestry restoration business dimensions of forest restoration. Starting with the one most widely recognized expert in each of three areas – restoration-related sociology, economics, and entrepreneurship/business – as determined by the NMFWRI, we (a) explained the study and its objectives and methodology; (b) asked the candidates to participate in the Delphi process; and (c) asked them to recommend to the research team at least one other person whom they felt was a leading expert in socioeconomic aspects of forest restoration, including entrepreneurship and business. This process continued until 11 experts had committed to the process.

The experts were fairly equally divided among social (n=4), economic (n=3) and business/entrepreneurship (n=4) dimensions of forest restoration. Several experts came from the research/academic community and had conducted systematic inquiry into forest restoration processes, while others were entrepreneurs with direct links to CFRP and forest restoration. Four of these experts own and manage forest restoration-related businesses and have been participants in the CFRP process.

Delphi iterations. This Delphi process spanned four iterations during a period of nine months. Patterned after work conducted by Egan and Jones (1995), the process was used to capture and document expert input on the most appropriate indicators and measures for forest restoration projects, then to reduce and organize this input, resulting in a consensus model among the expert panel. Also consistent with Egan and Jones (1995), ratings for each indicator were used as weights in order to provide a sense of prioritization and relative values among indicators. Measures were identified and refined during the third and fourth iterations of the process.

Delphi iteration one. The first Delphi iteration was launched in August, 2010. All 11 experts were sent an e-mailed letter reintroducing them to the study, reiterating the study's objectives, and articulating the assignment for round one. The objective of the first round was to capture, synthesize and document what the experts felt were the most important socioeconomic indicators for forest restoration projects, their sense of how the indicators that they offered might be prioritized, and their rationales for the indicators that they offered.

The first round resulted in 67 indicators, with some Delphi experts offering and ranking more than the requested five indicators and/or providing similar but not identical indicators that the research team maintained as unique until the experts themselves identified them as similar enough to combine during subsequent rounds of the process. The research team gathered and organized the indicators into six thematic areas: collaborative participation, employment, training, outreach and education, wood utilization, and business sustainability. Additionally, there were three indicators that the research team felt did not fit in any of the proposed thematic areas and were placed in an "other" category. Where it was obvious that indicators from Delphi experts were clearly similar, the research team combined a couple of indicators, reducing the total number of indicators from 67 to 62 (Table 1). Further reductions and refinements were achieved as the Delphi process unfolded.

Table 1. Indicators (n = 62) emerging from the first Delphi iteration, organized by thematic areas proposed by the research team.

Thematic Area	IND #	Indicator
Collaborative Participation		
	1	Institutional arrangements created (e.g., MOUs, agreements).
	2	Integration of local and scientific knowledge.
	3	Number of individuals and stakeholders involved/represented in project design, implementation and monitoring.
	4	Percent of stakeholders who agree that their interests and concerns were addressed during project design.
	5	Percent of stakeholders who agree that their interests and concerns were addressed during project implementation.
	6	Multijurisdictional collaboration (e.g., across land ownerships).
	7	Number of individuals attending project meetings.
Community Sustainability		
	8	Number of local businesses and number of contractors, both local and non-local, working on project.
	9	Community residents employed by contractors.
	10	Number of restoration contracts awarded and to which groups (e.g., local contractor, local businesses).
	11	Minimum income youth employment.
	12	Above poverty level permanent employment.
	13	Number of youth employed in resource-related fields.
	14	Local community employment in profit and nonprofit businesses.
	15	Number of local income families positively impacted as result of project.
	16	Forest product multiplier - Indirect benefit from creation of business (for every dollar spent by x business x dollars are created).
	17	Local community access to forest-related livelihood opportunities, including nontimber forest products.
	18	Efforts to create local benefit.
	19	Value of forest and range products generating local income.
	20	Number of residences and/or structures located certain distance from treatment area.
	21	Potential recreation benefit as result of forest restoration project.
Business Development		
	22	Sustained jobs (e.g., logging, thinning, monitoring and production operations). FT year-round vs. PT year-round vs. seasonal.
	23	Jobs created (e.g., monitoring, logging, thinning and production operations). FT year-round vs. PT year-round vs. seasonal and sustained.
	24	Small business and infrastructure creation (e.g., number of processing and production facilities created).
	25	Retention of workers.
	26	Promotional opportunities/advancement within the business.
	27	Position, wage and duration of jobs created by project.
	28	Job quality/improvement.
	29	Number of logging and processing firms working on the project.
	30	Number of small businesses positively impacted.
	31	Utilization of small-diameter material.
	32	Investment in mechanized equipment.
	33	Number of acres treated, volume of trees cut (e.g., lop and scatter)
	34	Does wood utilization improve the economics (profitability) of the project?
	35	Quantity of wood product produced (e.g., firewood, pellets, slash, tree boles).

Table 1. *(Continued)*

Thematic Area	IND #	Indicator
Business Development (cont.)		
	36	Profitability of business by local contractors on sale of wood products (e.g., vigas, fuelwood) or finished products (e.g., furniture made locally from restoration projects).
	37	Business capacity trends.
	38	Business payroll expenses and variable/fixed costs.
	39	Percentage of total income of logging and processing firms derived from the project.
	40	Efficiency of production/efficiency on the job.
	41	Time invested in project.
Public Support for Forest Restoration		
	42	Long-term planning.
	43	Perception of improved ecosystem function.
	44	Forest restoration knowledge and education.
	45	Perception of benefit of project by public.
	46	Appreciation of stakeholders and public of contribution that biomass utilization does towards increasing sustainability.
	47	Leaving behind environmental legacy.
	48	Local community support of projects.
	49	Perception of surveyed people who support forest restoration work.
	50	Agency commitment to monitoring.
	51	Number of free fuel wood collection opportunities (benefit to locals).
	52	Education of youth.
	53	Educational program provided to local leaders.
Outreach, Education, and Training		
	54	Involvement of youth (age 18-25) in project deliverables and objectives.
	55	Improvement in worker and business professionalism.
	56	Number of workers trained.
	57	Safety training provided and number trained.
	58	Operational training and education provided and number trained.
	59	Equipment training provided and number trained.
	60	Youth training/acquiring of skills in forest restoration.
	61	Business assistance.
	62	Value of the forest worker/practitioner – certification recognizing training and professional aspect of employees by contractor, individual, land manager and community

Delphi iteration two. The second iteration was initiated in November, 2010, and again included an e-mailed letter outlining instructions for experts to follow. Responses to round one were also synthesized and e-mailed to Delphi experts during round two of the process. As in Egan and Jones (1997), major objectives of the second round were to solicit ideas on the relative values associated with each indicator and to reduce the set of indicators offered in the first round to those that were considered most important by the expert panel. Thematic areas were further refined in this round based on expert input and research team discussion. The thematic areas were revised to include: collaborative participation; community sustainability; business development; public support for forest restoration; and outreach, education and training. We asked panelists to comment on the revised thematic areas and the placement of indicators within each of these areas. All indicators were organized within these six categories and experts were shown in a table what the other anonymous experts had identified as indicators. Experts were asked to rate the 62 indicators, grouped by thematic areas, that were offered during the first round on a scale of one to five – with a one being an indicator that was not important and a five an indicator that the expert respondent deemed essential. Experts were also asked to offer rationales for their indicator ratings.

Delphi iteration three. To initiate the third Delphi round, experts were sent an introductory letter, the results from round two, and a document summarizing the suggestions received by panelists in round two for rewording and combining indicators. Instructions for round three of the process included: organizing and, perhaps in some cases, reducing information gathered and synthesized during the first two rounds; deriving more precise, measurable metrics for the indicators; and refining and consolidating indicators. In addition, offered as a way to further organize expert input, a model representing three levels or types of restoration projects was developed by the research team. Experts were asked to consider the model to help categorize indicators based on project duration and scale as well as project objectives and available project resources. The levels – A, B and C – were conceived as a set of three nested or concentric circles, with levels, or sets, of indicators defined as follows:

> A – A set of indicators that are considered "core" for any restoration project (including CFRP-funded projects) that aim to include at least the minimum effort to gauge socioeconomic effects or dimensions of a project. This set of indicators does not necessarily require specific expertise in social/economic dimensions of forest restoration in order to be successfully implemented. As with most CFRP-funded projects, these would typically be short-term restoration projects, generally implemented at the forest or stand level.
>
> B – A set of indicators that includes the indicators above (Set A), but also includes indicators that require more time, resources, and perhaps expertise on the part of the grantee to assess a broader range and depth of indicators. This category of indicators might be used primarily for projects whose purpose is to strike a balance between ecological and socioeconomic dimensions of forest restoration and/or are considered long-term (e.g., part of the long-term CFRP monitoring pool).
>
> C – A set of indicators that includes those found in sets A and B, but also incorporates indicators consistent with projects that include one or more of the following attributes: (1) the project is designed with a primary focus of evaluating social/economic impacts OR socioeconomic aspects are primary drivers of the restoration project; (2) the project has more sophisticated expertise/support in the area of socioeconomic aspects of forest restoration; (3) the project has the resources needed for a more in-depth evaluation of the social and economic dimensions of forest restoration projects; and (4) the project is cross-jurisdictional, long-term, and/or conducted at the landscape scale.

Delphi iteration four. The objectives for round four of the process were to: further review, refine, and comment on how indicators should be measured; react to and refine the model derived during the first three rounds; solicit expert reactions to the model that had been developed through the first three rounds; and gather expert impressions of this Delphi process and the model derived from it. Results of this final Delphi round were summarized in a metric (Table 2) and the model derived from the process was presented during two focused discussions – one with CFRP coordinators, the other with CFRP monitoring practitioners.

Results and Discussion

The research team recognized two primary outcomes of the four-iteration Delphi process: (a) a metric that represented thematic areas, socioeconomic indicators, levels at which indicators may be applied, indicator ratings, and suggested measures; and (b) a model, derived from the metric, for organizing, visualizing, and understanding Delphi expert input. In addition, the Delphi process and model that was derived therefrom were evaluated by the Delphi panel and a group of forest restoration monitoring practitioners.

The Metric

A metric, containing indicators and associated ratings, measures, and suggested levels at which they may be applied, was developed based on results of the four Delphi iterations (Table 2). The 67 indicators suggested by Delphi experts during the first iteration were ultimately reduced to 18 by the conclusion of the four-iteration process. Ways of measuring each indicator were also refined.

The Delphi experts reviewed and incorporated others' comments throughout the iterative process. By the conclusion of the process, indicators fell within five thematic categories: collaborative participation; community sustainability; economic impacts and outcomes; public support for forest restoration; and outreach, education and training. Instead of using a mean (average) cut-off point to reduce the overall number of indicators to those which were most salient, there was consensus that the metric would be reduced to those indicators supported by the majority (six out of eleven) of panelists. This resulted in 18 indicators that were carried forward: nine at Level A; four at Level B; and five at Level C. The distribution of indicators across thematic areas was fairly even, with both A-level and C-level indicators occurring in every thematic category; B-level indicators occurred in three of the five categories. The average rating (weight) over the 18 indicators ranged from 2.60 to 4.44.

Primary among the Level A indicators was job creation, which was rated the highest in importance of all Level A indicators and consistent with the high rating given to the creation of sustained jobs found in Level C. Other highly rated indicators in Level A included

number of stakeholders involved, local residents employed, youth involvement, and agency commitment. In Level B, Delphi experts suggested several additional indicators, including payroll expenses, small diameter utilization, and multijurisdictional collaboration. Level C indicators suggested longer-term projects and projects with a more deliberate focus on socioeconomic outcomes and included sustained jobs, long-term planning, and knowledge gained.

In addition, the research team analyzed the rankings and ratings assigned by Delphi experts for each indicator over the four iteration process to evaluate the potential collaborative effect of this process. That is, to what degree did Delphi experts reconsider and revise their own preconceived ideas about the most important socioeconomic indicators for forest restoration projects during the four-iteration "Delphi conversation?" Additionally, we wanted to see if there were any differences across the three expert panel areas (economics, social dimensions, and forest restoration businesses). These results are reported in the more comprehensive document describing the study posted at www.nmfwri.org.

Table 2. The metric: A summary of indicators, measures, and average ratings by level (A, B, and C) and thematic area, derived from Delphi expert input during round four. The column, Indicator Number, provides a reference to the numbered indicator(s) from round one that comprised the final indicator in the table.

LEVEL	THEMATIC AREA	INDICATOR NUMBER	INDICATOR	MEASURES	AVERAGE RATING
A	Collaborative Participation				
		3	Number of individuals and stakeholder groups involved/ represented in project design, implementation and monitoring	- Numerical count/tally of collaborators involved in the project (could include a ratio of mix of stakeholders actually present to the mix that would be possible [e.g., three of the six major stakeholder groups present] - List individuals and stakeholders involved/represented and what objectives are to be achieved by each stakeholder	3.64
		4	Percent of stakeholders who agree that their interests and concerns were addressed during project design	- Survey/questionnaire of all stakeholders and project participants identified in project proposal - Numerical count using percentage (could also include an explanation of percent that did not agree) - Interview stakeholders	3.09
		51	Number of fuel wood collection opportunities that benefit local communities	Numerical count/tally Presence or absence of fuel wood collection opportunities	2.60
	Community Sustainability				
		8, 9, 10 & 14	Community residents employed by and local businesses created (e.g., contractors, nonprofits, for profits) by project	Community residents employed by and local businesses created (e.g., contractors, nonprofits, for profits) by project - Numerical count/tally - List businesses and contractors and what each role is. - Percentage of project employees who are community residents - Number of opportunities created as a direct result of project - Economic breakdown of earnings and income made by businesses directly related to project	3.49
	Economic Impacts and Outcomes				
		23 & 27	Number of jobs created and position, wage and duration of jobs created by project (FT year round vs. PT year round vs. seasonal)	- Numerical count of jobs created - Numerical count of jobs created plus percentage of each over total employment	4.30
		33	Number of acres treated, volume of trees cut (e.g., lop and scatter)	- Numerical count and volume using GPS acres treated and volume of trees cut	2.90

LEVEL	THEMATIC AREA	INDICATOR NUMBER	INDICATOR	MEASURES	AVERAGE RATING
	Public Support for Forest Restoration				
		50	Agency commitment to monitoring	- Inspection reports - Dollars and number of FTE hours devoted to monitoring (needs to happen early in project) - Interviews with agency personnel - Questionnaire (e.g., project and agency partners' anonymous responses to questions about extent of agency involvement in selecting monitoring indicators, reviewing indicator data, and using results)	3.36
	Outreach, Educ. and Training				
		54	Involvement of youth (age 18-25) in project deliverables and objectives	- Number of youth and number of hours spent in education, training, project implementation, monitoring - Numerical count of youth involved - Interview youth and project grantees - Narrative description - Presence or absence of youth involved	3.40
		53, 56, 57, & 59	Number of workers trained and type of training provided (e.g., safety, operational, educational, and equipment)	- Narrative description of program, goals and objectives - Numerical count of education programs/outreach events aimed at local leaders - Interview workers and project grantees - Numerical count of workers trained and trainings provided and certifications received	3.40
B	Collaborative Participation				
		6	Multi-jurisdictional collaboration (i.e., across land ownerships)	- Number of agreements or joint projects and change over time - Absence or presence (with classification of entities – e.g., federal, state, BLM, tribal, and private agencies) - Number of land ownership/land management jurisdictions involved in the project - Ratio of number of jurisdictions involved out of those that it would be possible to involve - Interview landowner representatives involved in project - Narrative description of nature and complexity of collaboration by partners involved	3.09
	Community Sustainability				
		17	Local community access to forest-related livelihood opportunities, including nontimber forest products	- Number and volume of NTFP sales and permits awarded to local firms - Interviews or questionnaire administered pre- and post-project (e.g., percentage of those surveyed who say that local access has improved) - Local outreach conducted through advertising and word of mouth - Number of people using resources produced by project and identification of earnings related to these opportunities (e.g., timber, pine nuts, mushrooms)	3.40
	Business Development				
		31 & 35	Utilization of small diameter material and quantity of wood product produced (e.g., firewood, pellets, slash, tree boles)	- Detailed listing by primary project partners - List amount of each material utilized (e.g., quantification of SDT -tons, board feet) - Volume utilized by diameter class and species - Interview local community members about who is using the material, what are the end products and how much money they are making from this product - Regular (annual, or perhaps more frequent) accounting of volume of each product produced	

LEVEL	THEMATIC AREA	INDICATOR NUMBER	INDICATOR	MEASURES	AVERAGE RATING
C	Community Sustainability				
		16	Forest product multiplier - Indirect benefit from creation of business (for every dollar spent by x business x dollars are created	- Numeric economic indicator - Identification of businesses related to project that have been created or helped and monetary benefit (profit) related to project. Include business example of money spent on a business and indirect financial benefit as result (e.g., multiplier effect)	3.55
		21	Potential recreation benefit as result of forest restoration project	- GIS projection of visitor user days in project vicinity - Survey (quantification of benefits or opportunities, improvement of local access, recreational opportunities created) - Interviews with local community members, local and non-local visitors, and managing agency reps.	3.10
	Business Development				
		22	Sustained jobs (e.g., logging, thinning and production). FT year round vs. PT year round vs. seasonal	- Numerical count/listing of jobs sustained - Numerical count of each of the types of jobs plus percentage of each over total employment	4.44
	Public Support for Forest Restoration				
		42	Long-term planning	Long-term planning - Interview project grantees, beneficiaries of the project and agency officials - Narrative description/detailed listing by project partners of long-term plans	3.20
		44, 45, 46, & 49	Forest restoration knowledge gained by communities and perception of benefit of and support for forest restoration projects	- Surveys administered periodically (at least pre-and post-project) - Interview community members and project grantee - Numerical percentage of those surveyed who perceive a benefit	3.13

The Model

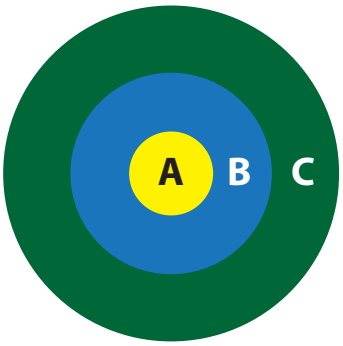
A model was developed that accounted for the rich and diverse input offered by Delphi experts and the complexity of and variability among CFRP and other forest restoration efforts (Figures 1 and 2). Derived from the socioeconomic indicator metric, the model is represented by three concentric circles representing nested levels of indicators, depending on the type of restoration project being considered.

The advantages of this model vs. one that attempts to represent indicators at only one core level include:

- It is more robust than simply having a relatively small set of core indicators drop out of the process.
- It provides forest restoration programs with a much more holistic approach to assessing social/economic impacts for various levels and types of forest restoration projects.
- It is not prescriptive, but is rather a flexible model for assessing the socioeconomic effects and aspects of the broad range of forest restoration projects and project objectives.
- It is inclusive – that is, all indicators derived from the Delphi process are included, although ratings and assigned levels (A, B, and C) are used to help distinguish among and organize the indicators. It is ultimately the responsibility of the user of the model to decide which indicators are most appropriate given project objectives and other project attributes.

In addition to being partitioned by project objectives and resource availability, indicators may also be partitioned by their average ratings, under the assumption that not all indicators should carry the same weight when evaluating the socioeconomic outcomes of a forest restoration project. Job creation, for example, appears to be the most important indicator for the evaluation of forest restoration projects and, where appropriate, likely should be assigned a value greater than that for other indicators. However, the authors suggest that the average ratings, as assigned by the Delphi panel, be rounded to the nearest 0.1 or 1.0 value. As in Egan and Jones (1997), where appropriate, such an approach could be used to arrive at an overall score for socioeconomic outcomes of a project. Alternatively, ratings may be used to help decide the resources allocated to the measurement of each indicator – with higher ratings suggesting greater resources allocated and/or more rigor applied in measurement.

Figure 1. The model for assessing socioeconomic indicators for forest restoration projects developed during the Delphi process.

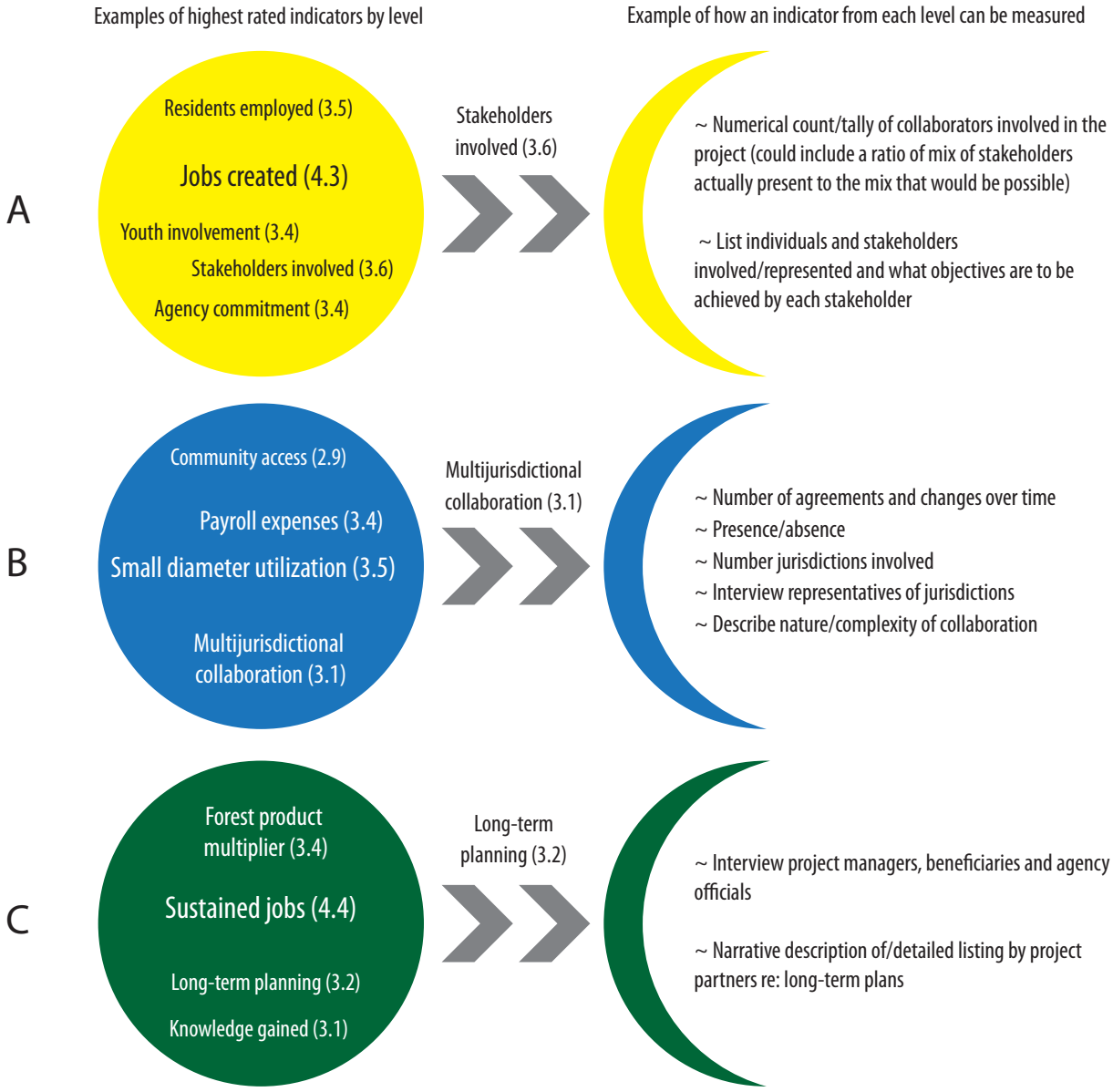


A: For any restoration project that wants to include at least the minimum effort to gauge socioeconomic effects or dimensions of a project .

B: Includes level A and additional B indicators that require more time, resources, and perhaps expertise on the part of the grantee.

C: Includes Level A and B indicators and additional C indicators. Project is one or more of the following: (1) designed with a primary focus of evaluating social/economic impacts; (2) has more sophisticated expertise/support; (3) is likely to be more long term; and (4) has the resources needed for a more in-depth evaluation.

Figure 2. Examples of the highest rated indicators, average ratings, and measures for the three levels of indicators – A, B, and C – as they are portrayed in the model derived from the Delphi process. Numbers in parentheses are average ratings for each indicator, as assigned by the Delphi participants. Font sizes and proximity to the center of the circles are used to emphasize the relative value (weight) of each indicator.



Process, Model, and Metric Evaluation

Delphi Expert Evaluations. During the fourth round, the research team asked the Delphi experts to evaluate (a) the Delphi process used by the research team; and (b) the model developed by the research team and to which experts reacted in rounds three and four. In addition, experts were asked for their opinions on how the process of developing forest restoration indicators could have been improved and for any additional comments that they wanted to offer.

All 10 experts who responded to the evaluation indicated that the Delphi process was appropriate given the objectives of the study. Additional, unedited comments on the Delphi process included:

- Seemed to work reasonably well for this particular project.
- Might have been interesting to include some of the grantees/practitioners themselves in the Delphi process.
- Delphi process was appropriate for extracting and refining issues concerning what should be measured and how.
- The Delphi process worked well for gathering and compiling substantive input. It's more efficient than a method involving dialogue among participants, but it may have been harder to resolve differences or address confusion this way.
- I am not a fan of the Delphi process, but I thought it was an appropriate tool to get the process started for identifying socioeconomic indicators for monitoring in CFRP. The process may help us gain insight into a likely set of indicators, but at a still fairly general level. I believe the final product is still likely to require a more focused working group and set of implementation tests to finalize indicators that are truly standardized and assessable for monitoring.
- The process worked pretty well and it was good to do it in stages. There was plenty of opportunity for input.
- The interactive process was helpful for academicians to consider measurable outcomes related to customs and culture that actually will make sense to the grantee and can be measured and be accountable for.
- There was a lot of input that was helpful to develop a monitoring plan.
- In retrospect, more could have been done earlier to help make sense of the participants' notes and comments, so that participants were provided with viable indicators and measures to comment on earlier in the process. While I think the final product has some good indicators, I feel like it doesn't quite add up, and that there are a lot of significant challenges with measures and measurement that will require additional work to create something that can be used.

Most (nine of 10) Delphi respondents indicated that the model derived from the Delphi process was appropriate, given input provided during the four iterations of the process. One expert decided not to respond to this part of the evaluation. Unedited comments included:

- Conceptual model should be useful for grantees to understand and implement.
- Levels of the model are solid, allowing for a progression from less to more complex assessments. At first I was skeptical of the more complex assessment levels but now view them as worthwhile and doable in certain cases.
- I'm neutral on the appropriateness of the model. It's not inappropriate, but to me it doesn't matter whether the circles are nested or just three categories of indicators.
- The model developed was appropriate in providing a broad sorting tool that recognizes the variability across project types and focus. The emergence of the potential A,B,C set is likely a feasible path for the CFRP to pursue.
- Model makes sense to me as it accounts for differences in temporal scale at which impacts will be felt.
- Model is appropriate, but don't make it absolute (i.e. if level C projects don't include all Level A).
- Layered criterion of increasing comprehensiveness is applicable and relevant.
- The model gives a broad range of monitoring tools. It gives the CFRP grantees a large spectrum of core social and economic indicators they can use in the monitoring process.
- I think this is a problematic model, as I think it conflates project scale, importance of indicators, and difficulty of indicators.

Note: Since the Delphi process was anonymous, Delphi experts were not aware that grantees/practitioners were among the Delphi experts and that the research team had planned from the initiation of the project to include input from both CFRP coordinators and monitoring practitioners during group meetings and interviews held after the fourth Delphi iteration.

In addition, while some Delhi experts commented on the amount of time that it took to complete the process, several Delphi experts suggested that the incremental approach to input solicitation and feedback allowed them the time to reflect and more willingly consider the input of others and revise their input based on the information of the other experts. Moreover, the process allowed for full exploration of indicators, starting with a total of 67 and reducing to the 18 highest rated indicators divided among three levels. As a result, indicators were more clearly developed, reworded and combined to arrive at a consensus model and metric.

Metric and Model Refinement for CFRP

Post-Delphi Focused Group Meetings. Once the metric and model were developed by the Delphi panel, two group meetings were conducted – one with CFRP coordinators and the other with CFRP monitoring practitioners. The purpose of the meetings was to solicit and develop ideas for refining the Delphi-derived forest restoration socioeconomic indicator metric and model to suit the objectives of the CFRP. Monitoring practitioners included representatives from nonprofit and for-profit businesses involved in the CFRP program and CFRP grant recipients.

CFRP Coordinator Group Meeting. CFRP coordinators were generally in favor with the model's nested, concentric circle approach, feeling that the model will provide grant recipients with an organized array of indicators they could measure. In addition, grantees indicated that they liked the format of the indicators and measures. One coordinator did not want USFS policy to drive the

socioeconomic monitoring process. According to another coordinator, while some of the indicators proposed by the Delphi experts have been measured by many grantees since the inception of the program, the contribution of this project should be to provide consistency and standardization of indicators and measures across the various CFRP projects so that they can be compared and aggregated to measure general programmatic progress. Comments on specific indicators developed by the Delphi process were:

- The involvement of youth indicator should include those younger than the age of 18. Could have one category for youth or break it out into younger than 18 and 18 to 25.
- Small diameter utilization and quantity of wood product produced (indicators 31 & 35) should be a Level A indicator, since documenting the quantity of wood products sold is already required by grantees. Utilization could also include a narrative discussion of what transport distances are needed to ensure a viable market for businesses. In this way, they could focus efforts on identifying potential users and wood product businesses within that distance.
- The utilization of small diameter material indicator could also include a narrative on what new markets were created and what new or additional end products this provides. It is important to track the traditional uses for wood as well as the higher value new products and markets that are developing.
- Calculation of volume may be beyond the ability of some projects. There was a suggestion to move volume calculation component of indicator to Level B.
- It is important to include the local communities affected by projects. There was a suggestion to add local communities to indicator 3, since they are affected by projects but may not be directly involved in the project's design, implementation or monitoring.
- Many in the group felt strongly that the number of fuel wood collection opportunities (indicator number 51) should be a core Level A indicator, despite its relatively low average rating (2.6) by the Delphi panel.

Monitoring practitioner group meeting. A focused discussion with nine individuals engaged in monitoring the outcomes of CFRP programs was conducted. The group liked the idea of a standard set of indicators and measures, although they felt that there should be a suite of possible indicators from which to select. Seeing the list allows one to choose what is relevant to a specific project and may give grantees some ideas of indicators and measures they could use. They also suggested that, for CFRP projects, mandatory indicators from the Level A list could be identified based on type of project – for example, planning vs. utilization grants. The group appeared to agree that weighting of indicators should not be used during socioeconomic assessments and grantees should be given the leeway to select a group of indicators from the Level A list. Others in the group suggested that if weighting of indicators is included in CFRP monitoring processes, the weights should be decided upon by grantees, not by the CFRP advisory panel or carried forward from the Delphi research findings.

The group also felt that it was important to capture the social component related to improvements to a community over time that accrue to restoration projects, particularly improvements in community life for youth. Some of current indicators deal with the employment of community members and education and training of community members, but the real question is: Is the community better off as result of the grant? Comments on specific indicators developed by the Delphi process were:

- It's important to make a distinction between creating jobs and providing short-term work. Jobs created should be measured using the following: job title, job type (full time, seasonal, part time), hours put in, and boiling it down to full-time equivalents of people.
- An important question to ask related to jobs is if seasonal work leads to additional employment.
- Assessing employment sustainability should/could be option for ALL projects.
- The jobs created indicator should include a narrative related to what happened, e.g., turnover related to employment created through CFRP.
- One of the indicators should include a narrative related to wildfire cost savings, i.e., how much money was saved by doing treatments. Could include also what prescribed burning was able to be accomplished as result of treatments. Additionally, a narrative could include a description of the benefits to resources as result of the project.
- Indicators 31 & 35 (utilization of small diameter material and quantity of wood product produced) should be moved to Level A.
- An agency monitoring indicator should not necessarily be measured as monitoring is the grantee's responsibility and the agency is often not funded for monitoring.
- Monitoring of youth should be required (i.e., number of youth participating and hours involved) as involvement of youth does not happen without this requirement.
- The youth involvement indicator should include elementary and middle school age. Create a separate category for those younger than 18, since youth involvement generally varies by age, but is equally important.
- Would suggest adding to Level C indicators tracking of youth after five years – monitoring if they are working in a natural resource related field.
- Businesses created or stabilized should be included in Level A indicators as part of the business development thematic area as it is an avenue to get business going. Could be Level A version of forest product multiplier indicator (Level C indicator).

Conclusions

Given the diverse goals and objectives of forest restoration programs and projects, the socioeconomic outcomes of these efforts can be complex to understand and measure. Past work has been conducted to develop socioeconomic indicators for forest restoration efforts, including those related to CFRP-funded projects. The process of indicator development has been evolving, as the forest restoration community develops keener interest and expertise in this important dimension of restoration. However, among the challenges associated with understanding the socioeconomic out-

comes of forest restoration have been a lack of consistency in identifying core socioeconomic indicators across projects and how they may be measured; a paucity of systematic and objective approaches to indicator development; the challenge of achieving consensus among diverse stakeholders; and uneven efforts to solicit the opinions of forest restoration stakeholders on the most appropriate indicators and protocols.

Despite its potential challenges – including the unbiased identification of experts and time commitments on the part of Delphi participants– the Delphi process used in this study offered distinct advantages over some earlier efforts to identify socioeconomic indicators for restoration projects, including the systematic solicitation and synthesis of expert opinion, as well as an evaluation and refinement process that included input from Delphi experts, CFRP coordinators, and monitoring practitioners. That all Delphi experts saw this project through to its conclusion is a testament to their commitment to and interest in the project. Moreover, all responding Delphi experts in this study agreed that the Delphi process was an appropriate method to achieve the objectives of this project.

In general, the indicator ratings (means and medians), or weights, derived in this study provide a mechanism for prioritizing indicators under the assumption that indicators do not bring equal value to the overall socioeconomic assessment of forest restoration projects. Average ratings (or, as a more statistically correct alternative, median ratings) may be used in a number of different ways. They may (a) provide guidance on which indicators to assess, with those indicators with higher ratings receiving preference for inclusion in a project's overall socioeconomic evaluation; (b) where desirable, provide a mechanism for scoring the overall socioeconomic outcome for a project; and (c) provide a guide for resource allocation during socioeconomic assessments. In addition, monitoring practitioners or restoration program administrators may decide to select from among the indicators, and the thematic categories may be used to determine which of the indicators to use based on project objectives.

A critical step in the development of socio-economic indicators for this project was the refinement of the Delphi-derived metric and model by CFRP stakeholders. This process represented a deliberate effort to refine the large Delphi-derived model/metric to meet the specific objectives and needs of the CFRP and its stakeholders. For example, results of metric and model refinement suggested that strong regional differences in the significance and appropriateness of socioeconomic indicators may exist. Opportunities for local residents to collect fuel wood from forest restoration thinnings, for example, may be more important in some regions than in others and should be considered core for projects implemented in those regions. Monitoring practitioners are encouraged to consider important regional, cultural and other project-specific characteristics before deciding on which indicators to measure for a given forest restoration project, irrespective of the rating/weight derived for those indicators or the levels to which they've been assigned. As with any attempt to understand something as potentially complex as socioeconomic indicators for the vast array of forest restoration projects and project objectives, this should be a continuing and inclusive process.

Finally, it's important for program administrators and grantees to understand that an effective evaluation of socioeconomic project outcomes often requires specific expertise in social science methods and adequate protection of human subjects. Surveys, focus groups and key informant interviews, for example, are specific social science methods that require background, training, and preparation to be implemented well. Unfortunately, it is too often assumed that social science is easy science and that interest in the socioeconomic dimensions of forest restoration necessarily equates to expertise. In addition, given the potential sensitivity of information that could be derived from some socioeconomic assessments – including that related to restoration business costs, revenues, and markets, for example – it's critical that the information and those who provide it are afforded adequate protections.

Recommendations for CFRP

The objectives of this effort were to develop socioeconomic indicators for forest restoration projects, develop a metric and model that organizes these indicators, and offer refinements based on inputs from CFRP coordinators and monitoring practitioners. While the decision as to which socioeconomic indicators are considered for CFRP-funded projects ultimately lies with the administration of the CFRP, including its advisory and coordinating groups, when considering socioeconomic indicators for CFRP-funded projects, the authors offer the following recommendations, many of which are consistent with the results and conclusions of this report:

- Pay close attention to the indicators that have been developed and delineated (Table 2), especially those to which experts have given the highest ratings. For example, the five highest rated indicators in Level A are jobs created; stakeholders involved; community residents employed; youth involvement; and agency commitment (Figure 2).
- Consider the concentric circle model (figures 1 and 2) that accounts for various types of restoration projects. Those indicators included in Level A (Table 2) could be considered core for any CFRP-funded project. However, so-called "utilization" projects and those that involve planning and treatments that are cross-jurisdictional should include A-level and B- and C-level indicators, again depending on available resources and expertise (Appendix B).
- However, allow for flexibility that recognizes regional differences. For example, opportunities for the collection of firewood may be more important to assess in northern New Mexico than in other regions of the state. The section of this report related to the refinement of the metric and model for CFRP (p. 26-28) should be used as a guide.
- Permit the process of indicator delineation for CFRP to evolve as indicators are applied and socioeconomic outcomes of CFRP-funded projects are assessed and tested over time.
- Consistent with that which is expressed in the Conclusions section of this report, the authors consider it critically important to provide adequate protection for human subjects and the information derived therefrom. For example, information related to aspects of restoration-based businesses, perhaps most relevant for utilization grants, should be treated with appropriate respect and business owners informed of their rights to comply.

Most colleges and universities have policies and committees that can inform this important process.

- During the application and/or granting processes, determine the level of rigor required for the measurement of socioeconomic project outcomes collected during the life of the grant. If projects' socioeconomic short- or long-term effectiveness is important to CFRP, baseline data collected during the grant period must be collected, analyzed, and reported in such a way that reliable estimates of socioeconomic outcomes can be assessed.
- Underscore with grantees – especially those whose projects may become part of the long-term monitoring population – that the collection and analysis of socioeconomic data requires appropriate planning and expertise to be accomplished well. The conduct of surveys and interviews, for example, is often taken for granted and done without the careful planning and question development and testing required to obtain reliable results.

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Appendixes

Appendix A. Delphi Expert Bios

Robert Berrens is a professor in the Department of Economics at the University of New Mexico and has served as department chair since 2008. Professor Berrens is an associate editor of the journal *Water Resources Research* (2007-2009), and is coeditor of the journal, *Contemporary Economic Policy* (since 2008). He is also a senior fellow for the Robert Wood Johnson Foundation Center for Health Policy at UNM. Robert specializes in the field of environmental and resource economics, focusing on land, water, forest, wildfire, climate change and biodiversity issues. He has authored or coauthored more than 100 professional publications, including papers in a wide variety of economics, environmental management and public policy journals. He has served as an independent scientist on the Technical Advisory Panel for the Collaborative Forest Restoration Program since 2006.

Sherry Barrow, of Sherry Barrow Strategies (SBS), LLC, in Ruidoso/Glencoe, New Mexico, manufactures animal bedding, timbers, beams, kiln-dried lumber, corbels, mantles, fuel wood, home furnishings and other wood products from forest and watershed restoration efforts in southeastern New Mexico. With a background in strategic planning, marketing and public relations, education, nonprofit management and leadership development, Sherry has formed a successful collaborative of local and inter-dependent businesses working to create sustainable forest industry. SBS has successfully completed fuels reduction, forest restoration, and thinning, contracts for Village of Ruidoso, the City of Alamogordo, private land owners, N.M. State Forestry, N.M. State Land Office, and the U.S. Forest Service. SBS has been a grant recipient of CFRP.

Douglas S. Cram is an assistant professor in the Extension Animal Sciences and Natural Resources Department at New Mexico State University. His research and extension efforts focus on forestry and fire ecology in the Southwest. He is actively involved in several collaborative processes in New Mexico, including the Collaborative Forest Restoration Program.

John Fowler has been a professor of agricultural economics at New Mexico State University for 32 years. Starting as an agricultural economist for the Range Improvement Task Force, John then became the coordinator of the RITF, which he has done for the last 26+ years. He is the distinguished chair of the Linebery Policy Center. John has written more than 100 publications related to natural resource policy and impacts to rural communities and their economies. He has made frequent visits to Washington, D.C., testifying on resource issues and their impacts on rural economies.

Glenn Griffin is the owner of Gila Tree Thinners (GTT), a forest restoration business. He has worked to improve the forest health situation in the Silver City area through use of restoration practices and the creation of defensible space. Additionally, he has focused on the creation of jobs and improvement of the local community economy through collaboration with multiple partners such as Gila National Forest, New Mexico State Forestry, BLM, local sawmills, local firewood vendors, Gila WoodNet, and State of New Mexico Fort Bayard Biomass Heating Plant. Gila Tree Thinners has been the recipient of two CFRP grants.

Jim Kellar is the owner of K&B Timberworks, Inc. The focus of his work is the production of timbers, cants, dimension lumber, specialty cuts, clean wood chips, bark and saw dust. Prior to this, Jim was the owner of Kellar Logging, Inc. He spent 22 years working in mechanical harvesting of timber and forest restoration work with various collaborators, including the USDA Forest Service, State Forestry, and private landowners. Kellar Logging has been a recipient of CFRP grants.

Rebecca McLain is a senior social scientist at the Institute for Culture and Ecology. Her work includes research on the socioeconomic impacts of large-scale ecosystem management policies in the Pacific Northwest, the role of informal economic activity in rural communities, and the social organization of nontimber forest products harvesting in the United States and Canada. She is collaborating on a project exploring links between forest governance devolution, biodiversity conservation, and sustainable livelihoods in Latin America, Asia, and Africa.

Ann Moote is a consultant in natural resources policy, planning, and process design. In recent years, she has developed monitoring methods and performance evaluation protocols for federal, state, and local natural resource management programs; provided trainings and technical assistance in collaborative resource management and multiparty monitoring; and researched policy barriers to collaborative and community-based conservation. Ann coordinated the Social Science and Community Outreach Program at the Ecological Restoration Institute at Northern Arizona University from 2002-2007 and was a senior researcher and faculty member in the Environmental Conflict Resolution Program at the Udall Center for Studies in Public Policy at the University of Arizona from 1998-2001.

Cassandra Moseley is the director of the Ecosystem Workforce Program (EWP) and director of the Institute for a Sustainable Environment at University of Oregon. She is a core group member of the Rural Voices for Conservation Coalition and a former board member of the Flintridge Foundation and the Applegate Partnership. She is an associate editor of the *Journal of Forestry*. As director of the EWP, Cassandra has developed applied research and policy education programs. Her focus has been community-based forestry, federal forest management, and sustainable rural development. She is coeditor of *People, Fire, and Forests: A Synthesis of Wildfire Social Science* (2007) and is coauthor of *Collaborative Environmental Management: What Roles for Government?* (2004).

Brent Racher is a manager or partner for two natural resource management companies in New Mexico, Racher Resource Management and Restoration Solutions; and two woody biomass supply/utilization/development companies, Western Biomass and Southwestern Biomass. Through his companies, he has provided private and government entities with expert fire management for planning and operations as well as providing progressive mechanical and chemical vegetation manipulation to land managers in need of that expertise. Brent

is collaborating to expand renewable energy resources in the West through the utilization of ecologically unbalanced biomass in forests, woodlands, and non-native phreatophyte communities. In addition, Brent is currently on two federal advisory committees for the Collaborative Forest Restoration Program, a New Mexico program, and the Collaborative Forest Landscape Restoration Program, a national program. He is serving as the president of the New Mexico Forest Industry Association.

Carol Raish is a research social scientist at the USFS Rocky Mountain Research Station, Albuquerque Laboratory. She has BA degree in Spanish and the MA and Ph.D. degrees in anthropology/archeology. Her research interests include understanding the roots of land-use conflict on public lands and the role of traditional economic practices, such as ranching, in maintaining cultural identification, traditional life ways, and nonfragmented landscapes among American Indians, Hispanic Americans, and Anglo Americans in northern and central New Mexico. She is also conducting research on community beliefs and preferences concerning both managed fire and wildfire among national forest users in the Southwest and on the Valles Caldera National Preserve, New Mexico.

Appendix B. Recommended indicators for CFRP projects, based on average ratings – presented by level and thematic area – and recommended ways of measuring those indicators, as derived from expert opinion and focused discussions.

Level A Project Indicators (9) – For any restoration project that aims to include at least the minimum effort to gauge socioeconomic effects or dimensions of a restoration project

1. Number of individuals and stakeholder groups involved/represented in project design, implementation and monitoring (Rating = 3.6; Collaborative Participation Thematic Area). Assessed by:
    - Numerical count/tally of collaborators involved in the project (could include a ratio of mix of stakeholders actually present to the mix that would be possible [e.g., three of the six major stakeholder groups present]
    - List individuals and stakeholders involved/represented and what objectives are to be achieved by each stakeholder.
2. Percent of stakeholders who agree that their interests and concerns were addressed during project design (Rating = 3.1; Collaborative Participation Thematic Area). Assessed by:
    - Survey/questionnaire of all stakeholders and project participants identified in project proposal
    - Numerical count using percentage (could also include an explanation of percent that did not agree)
    - Interview stakeholders
3. Number of fuel wood collection opportunities that benefit local communities (Rating = 2.6; Collaborative Participation Thematic Area). Assessed by:
    - Numerical count/tally
    - Presence or absence of fuel wood collection opportunities
4. Community residents employed by and local businesses created (e.g., contractors, non-profits, for profits) by project (Rating = 3.5; Community Sustainability Thematic Area). Assessed by:
    - Numerical count/tally
    - List businesses and contractors and what each role is
    - Percentage of project employees who are community residents
    - Number of opportunities created as a direct result of project
    - Economic breakdown of earnings and income made by businesses directly related to project
5. Number of jobs created and position, wage and duration of jobs created by project (FT year-round vs. PT year-round vs. seasonal) (Rating = 4.3; Economic Impacts and Outcomes Thematic Area). Assessed by:
    - Numerical count of jobs created
    - Numerical count of jobs created plus percentage of each over total employment
6. Number of acres treated, volume of trees cut (e.g., lop and scatter) (Rating = 2.9; Economic Impacts and Thematic Area). Assessed by:
    - Numerical count and volume using GPS acres treated and volume of trees cut
7. Agency commitment to monitoring (Rating = 3.4; Collaborative Participation Thematic Area. Assessed by:
    - Inspection reports
    - Dollars and number of FTE hours devoted to monitoring (needs to happen early in project)
    - Interviews with Agency personnel
    - Questionnaire (e.g., project and agency partners' anonymous responses to questions about extent of agency involvement in selecting monitoring indicators, reviewing indicator data, and using results)
8. Involvement of youth (age 18-25) in project deliverables and objectives (Rating = 3.4; Outreach , Education and Training Thematic Area). Assessed by:
    - Number of youth and number of hours spent in education, training, project implementation, monitoring
    - Numerical count of youth involved
    - Interview youth and project grantees
    - Narrative description
    - Presence or absence of youth involved

9. Number of workers trained and type of training provided (e.g., safety, operational, educational, and equipment) (Rating = 3.4; Outreach, Education and Training Thematic Area). Assessed by:
    - Narrative description of program, goals and objectives
    - Numerical count of education programs/outreach events aimed at local leaders
    - Interview workers and project grantees
    - Numerical count of workers trained and trainings provided and certifications received

Level B Project Indicators (4) – Includes Level A and the Level B indicators below. These indicators may require more time, resources, and perhaps expertise on the part of the grantee and/or reflect projects that may be long-term and across jurisdictions.

1. Multi-jurisdictional collaboration (i.e., across land ownerships) (Rating = 3.1; Collaborative Participation Thematic Area). Assessed by:
    - Number of agreements or joint projects and change over time
    - Absence or presence (with classification of entities – e.g., federal, state, BLM, Tribal, and private agencies)
    - Number of land ownership/land management jurisdictions involved in the project
    - Ratio of number of jurisdictions involved out of those that it would be possible to involve
    - Interview landowner representatives involved in project
    - Narrative description of nature and complexity of collaboration by partners involved
2. Local community access to forest-related livelihood opportunities, including non-timber forest products (Rating = 3.4; Community Sustainability Thematic Area). Assessed by:
    - Number and volume of NTFP sales and permits awarded to local firms
    - Interviews or questionnaire administered pre- and post-project (e.g., percentage of those surveyed who say that local access has improved)
    - Local outreach conducted through advertising and word of mouth
    - Number of people using resources produced by project and identification of earnings related to these opportunities (e.g., timber, pine nuts, mushrooms)
3. Utilization of small diameter material and quantity of wood product produced (e.g., firewood, pellets, slash, tree boles) (Rating = 3.3; Economic Impacts and Outcomes Thematic Area). Assessed by:
    - Detailed listing by primary project partners
    - List amount of each material utilized (e.g., quantification of SDT -tons, board feet)
    - Volume utilized by diameter class and species
    - Interview local community members about who is using the material, what are the end products and how much money they are making from this product
    - Regular (annual, or perhaps more frequent) accounting of volume of each product produced
4. Business payroll expenses and variable/fixed costs (Rating = 3.4; Economic Impacts and Outcomes Thematic Area). Assessed by:
    - Numerical value of expenses and numerical value of variable and fixed costs
    - Interviews with business owners

Level C Project Indicators (5) – Includes Level A and B indicators and additional C indicators. Project is one or more of the following: (1) designed with a primary focus of evaluating social/economic impacts; (2) has more sophisticated expertise/support; (3) has the resources needed for a more in-depth evaluation; and (4) the project is cross-jurisdictional, long-term, and/or conducted on the landscape scale.

1. Forest product multiplier - Indirect benefit from creation of business (for every dollar spent by x business x dollars are created (Rating = 3.6; Community Sustainability Thematic Area). Assessed by:
    - Numeric economic indicator
    - Identification of businesses related to project that have been created or helped and monetary benefit (profit) related to project. Include business example of money spent on a business and indirect financial benefit as result (e.g., multiplier effect)
2. Potential recreation benefit as result of forest restoration project (Rating = 3.1; Community Sustainability Thematic Area). Assessed by:
    - GIS projection of visitor user days in project vicinity

- Survey (quantification of benefits or opportunities, improvement of local access, recreational opportunities created)
- Interviews with local community members, local and non-local visitors, and managing agency reps.

3. Sustained jobs (e.g., logging, thinning and production). FT year-round vs. PT year-round vs. seasonal (Rating = 4.5; Economic Impacts and Outcomes Thematic Area). Assessed by:
    - Numerical count/listing of jobs sustained
    - Numerical count of each of the types of jobs plus percentage of each over total employment
4. Long-term planning (Rating = 3.2; Public Support and Forest Restoration Thematic Area). Assessed by:
    - Interview project grantees, beneficiaries of the project and agency officials
    - Narrative description/detailed listing by project partners of long-term plans
5. Forest Restoration knowledge gained by communities and perception of benefit of and support for forest restoration projects (Rating = 3.1; Public Support and Forest Restoration Thematic Area). Assessed by:
    - Surveys administered periodically (at least pre-and post-project)
    - Interview community members and project grantee
    - Numerical percentage of those surveyed who perceive a benefit

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