Economic Development Report

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The Community Economics of Community Forestry: A Conceptual Framework and Partial Illustrative Analysis

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Introduction

Community Based Forestry (CBF) implies commitment to the long term ecological, economic and social well being of forest dependent communities. CBF, or community scale sustainable forestry, constitutes a departure from industrial forestry due to this commitment to the preservation of the ecological integrity of the forest ecosystem in perpetuity and to the maintenance or improvement in the quality of life in the host or gateway community in addition to seeking profits from forest products sales (CDS et al., 2000).

One important question facing funding agencies and community organizations is whether or not, or to what extent and under what conditions, are communities better off where there is a community-based forestry organization (CFO). The initial query is followed by questions of just what is meant by "better off" and against what alternative states of reality community forestry should be measured. Since the appropriate economic development path will, of course, depend upon the objectives of the community and the actual implications of any chosen path will vary due to local conditions, deriving community specific recommendations or results based upon more general findings is inappropriate. Moreover, it is misleading to extrapolate case study results to infer a broad understanding of the relative efficacy of available forest resource management alternatives across locations or communities.

In brief, CBF and CFOs present a substantial analytical challenge. Here, we propose analytical framework from which the role of CFOs in the economic development of resource dependent communities might be viewed. We identify the potential sources of economic benefit derived from forest related activities and how they may tend to vary across management alternatives. We review what the academic literature has to offer regarding these sources of economic benefit. Finally, we employ the tools of community or regional economic analysis to illustrate some of the benefits derived from CFOs.

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This analysis simulates the perspective of a hypothetical forest dependent community facing an uncertain future. It attempts to systematically address the question of the appropriate economic development path for a community to follow when faced with the following potential alternatives: industrial forestry, community based forestry led by a private cooperative or nongovernmental organization, or community scale natural resource based development without attempts at private coordination (i.e., no management).

Social benefit cost analysis provides the analytical lens for the study. SBCA helps us to properly frame the economic development question in terms of the forest management alternatives available to forest resource dependent communities. We spend a substantial amount of time discussing the great number of issues that should be considered, not because we will fully explore the answers to each of them here, but rather so that resource dependent communities can learn to ask the right questions in assessing the economic development decisions they face.

Although wood is a primary, potentially focal, economic output of forest management, forests potentially generate a great variety of economic goods and services including recreational opportunities, wildlife habitat, biological diversity, carbon sequestration, air and water quality, viewscapes and rural lifestyles. If we were only to count the jobs and income generated by wood production we would create a highly inaccurate view of the role of forests in the economies of forest dependent communities and, quite likely, overvalue the contribution of industrial forest management relative to community forest management in its contribution to community welfare. The results of existing market and nonmarket economic valuation techniques inform our understanding as to the likely direction and magnitude of these various values forest management alternatives might generate or destroy at the local or broader spatial scale.

Finally, CBF organizations may assume a great variety of potential roles in a community. These roles may have direct, indirect and/or induced economic impacts on a community. We employ commonly used regional economic development techniques to highlight the local economic impact of CFO programs by tracing the recent activities of two community forestry operations through the local economies, Wallowa Resources, a CFO located in NE Oregon and Public Lands Partnership (PLP), a CFO located in SW Colorado. This approach is at variance with the more common application of the same regional economic tools, as it turns the analysis upside down. Typically, regional economic approaches take a snap shot of an entire economy and then attempt to discern the impact of an individual industry or sector on the entire economy, or from the top down. Here we begin with CBF programs and derive the impact on the economy from the programs upward. This is only possible due to close collaboration with the CFO as to the inputs, outputs, intended and unintended outcomes of their programs.

In brief, our analysis begins broadly and progressively narrows. First, we address how the economic impact of community based forestry should be analyzed. Next, we identify what sort of economic impacts might differ across forestry management alternatives. Finally, we illustrate the likely economic impact of CFO organization programming efforts within the broader context of the economy of a resource dependent community in rural NE Oregon and SW Colorado.

Community Scale Forestry Management Alternatives

For our purposes, industrial forestry is a management system that views forest resources as private property (whether they are found on public or private lands) and is motivated by firm level profits alone. Community forestry is seen as a management regime motivated by long term ecosystem health and economic development at the community scale, not simply profits. No management is viewed as the management alternative that is neither industrial, nor community. In essence, we are trying to set up an investigation of what is gained or lost in those communities where these three development alternatives may be available, yet only one path can be chosen in a particular place and time.

Due to the power of financial incentives, it is most likely that community forestry and no management are the actual management alternatives facing a community. It is not likely that community forestry and industrial forestry are, in fact, choices that communities have. It is more likely that community forestry evolves from a situation where industrial forestry was not ever or is not currently sufficiently profitable to attract industrial

forestry and where the "no management" alternative is present immediately prior to the decision to move forward with a community solution. Financial incentives may be driven directly by market forces, by ecological factors, the legal or social context, and/or by federal, state or local policies.

We envisage that forest stewardship will differ across two institutional dimensions: ownership (i.e., public or private) and management (i.e., industrial, community, and no management) (Table 1), resulting in a broad typology of six potential stewardship arrangements. We, thereby, define stewardship as a combination of ownership and management dimensions wherein "good" stewardship implies ecological, economic and distributional objectives are likely to be met. Under conditions of perfect information, we would be able to describe in detail the likely stewardship implications of adopting one management style over another, given the property institution in place. However, we are unlikely to have such detailed and generalizable information in practice. As a result, we will first describe the potential factors contributing to forest stewardship and then attempt to assess the relative contribution of each management style to each factor qualitatively (positive, neutral or negative). Next, we will look to the academic and gray literature to gauge the relative magnitudes and ranges of possible values each of the factors might take and therefore, the relative tradeoffs of adjusting the management scheme to improve stewardship over specific factors. Finally, we will apply information collected from individual CFOs to illustrate the influence of their programs on their local communities.

Table 1. Management and ownership dimensions of forest resources

	Ownership	
Management Style	(A) Public	(B) Private
(1) Industrial Forestry (private property)	1A	1B
(2) Community Forestry (common property)	2A	2B
(3) Idle/unmanaged (Status Quo) (open access)	3A	3B

Although these calculations will certainly result in a partial depiction of the role of CBF in the economic development of forest dependent communities, they will provide a more complete picture than currently exists and point to specific areas of informational need in order to complete the economic analysis. Since we are analyzing CBF, an economic approach will provide only one part of an overall understanding of the implications of community development decisions made in forest dependent communities. Ecological and institutional pieces of the analysis, though not lacking in economic implications, are discussed elsewhere.

Analytical Approach: Social Benefit Cost Analysis

Our analysis takes the Capitals Framework as a jumping off point, focusing on the development and transformation of scarce and valuable human, social and natural capital into valuable economic outputs. We frame the alternatives in terms of Social Benefit Cost Analysis (SBCA), which we hope will facilitate an understanding of the likely tradeoffs among community development alternatives over time. At this point, we provide a common analytical framework within which we hope to characterize focal case communities in order to eventually generate a more robust statistical understanding of the predictive and descriptive features of economic development alternatives in forestry dependent communities. To date, the approach provides two case study illustrations informed by the available literature on the topic.

Standing

Having identified three potential community economic development alternatives for forest dependent communities, the next step is to define standing, or whose benefits and costs matter to our analysis. The analysis of all three alternatives must proceed at the same social and geographic scale and the scale chosen should at minimum reflect where both costs and benefits are concentrated.

CBF is found under two distinct land tenure designations; private and public. The narrowest possible definition of standing in this case would be the owners of private nonindustrial or industrial forestlands within a particular location or community. Financial project analyses are often undertaken from this narrow perspective where profit-making is the sole objective of the client. However, when CBF is found in communities characterized by private non-industrial forestlands, some sort of cooperative structure commonly evolves to manage these lands on behalf

of the cooperative's membership, or landowners. To the extent that the landowners have broader community interests, these interests may weigh into their decision-making in addition to ecological management of their holdings and profit from their sales. In addition, these landowners purchase productive inputs (labor, machinery) from members of a community or communities and use public infrastructure and other facilities, often pay taxes to a community (as well as the state or nation), so it is likely that the minimum acceptable scale of analysis across alternatives should be the local community.

When CBF is found in gateway communities to federal or state forestlands, a private nongovernmental organization (NGO) typically evolves to facilitate economic development features of forestry activities on public lands. The activities of these NGOs could be only to serve the contributors to or participants in the organization, but are more often observed to have broader social interests, in line with the tenets of CBF.

When the "owner" of the land is the state or federal government, it is tempting to ascribe standing to the citizens, or perhaps residents, of the appropriate jurisdiction. The standard argument is that if the people of the United States are taxed to manage the land, they must be benefiting from their ownership and have a stake in land management alternatives. The counter argument is that people in gateway communities stand to gain or lose the most (gains or losses are concentrated) by resource management decisions made by government agencies, that these gains or losses would be overwashed by miniscule per capita gains or losses (they are diffuse) at the national level. It has become a matter of policy for federal agencies to take local implications of their decisions into account. As a result, we adopt this convention, ascribing formal standing only to the gateway community or jurisdiction (often the county), and note only the type and likely direction of impacts at the broader state or federal scale.

Discount rate and analytical time scale

Since the benefits and costs of the economic development alternatives accrue and vary over time, our ability to compare current with future benefits and costs can be facilitated by the assignment of a discount rate. A discount rate, or rate of time preference, allows us to compress cost and benefit information over an extended time period to a single metric called present value. The higher the discount rate, the greater the preference for current benefits relative to future benefits. The lower the discount rate, the greater the influence of future opportunities on current decisions.

For a strictly financial analysis, the appropriate discount rate is the expected return to private investment capital. This would be the most appropriate discount rate from the perspective of a private non-industrial forestland or industrial forestry project or a CBF project that competes in the private sector marketplace. That is, the development alternative must generate a financial return of at least as much as the next best option for investing private capital, since profit is the motive. Often a private bank lending rate is used (i.e. 5-8% in 2006).

For an investment in public infrastructure, education, or other socially motivated programs, the rate of return, thus the discount rate, needs to meet or exceed the public borrowing/lending rate, since cost recovery is often the minimum standard for acceptance in the absence of known positive external effects. This would be most appropriate for training and education programs conducted by cooperatives or CBFs, where the expected returns are longer term and not necessarily profit motivated. Often the US Treasury bond rate is used (i.e., 1.5-4% in 2006).

Alternatively, a weighted average of the private and the public rate can be assumed where the alternative demonstrates both private and public benefits. This is most likely the appropriate approach here given the degree of internal variation in activities and motivations.

The length of the study, or time horizon, may also have important implications for the relative attractiveness of one alternative or another. The shorter the time horizon, the more likely a project that is strong on financial returns, but weaker on social or ecological benefits, will be preferred. Private economic feedback is quicker than public or social economic feedback, which is probably quicker than ecological feedback in many cases. In this case, it makes sense to push the time horizon to at least the length of a typical forest rotation, perhaps longer.

Beyond about 20-30 yrs, however, the effect of extending the time horizon of the project tends to be trivial due to discount rates. For example, at a 6% discount rate, $1.00 of benefit 30 yrs from now has a present value of about $0.17, and about $0.05 at 50 yrs. In addition, our ability to make meaningful predictions into the distant future is rather imprecise. As a result, we suggest a 25 yr time horizon across all economic development alternatives discussed here. Among the most important calculations will be the "salvage value" of the stock of forest resources at the end of the project analysis period.

Economic costs and benefits associated with forest dependent rural communities

The next task is to identify the potential sources of costs and benefits across alternatives. Economic benefits and costs can be consumptive (e.g., boards, poles) or nonconsumptive (e.g., hiking) in use. In addition, existence (e.g., preservation of endangered species), bequest (e.g., preservation of wildlands) or option (e.g., reserving the option to cut trees in the future) values may be significant. Finally, quasi-option value is the value of not making an irreversible decision in the face of uncertainty. For example, a forest slated for residential development may be better used for recreation in the short term, until the full economic and ecological implications of development are understood. Recreational use preserves the ability to impose more intensive residential development. The obverse does not hold.

Many of the important benefits and costs across the alternatives have to do with economic activities on the forest land:

- The most obvious benefits of forests are wood products. Potential products include wood for construction, paper, furniture, fencing and many others. The type, quantity and value of forest products will vary over time and by alternative. These are consumptive use values of renewable resources.
- Non-timber products may also be produced under one or more of the forest management alternatives. They include medicinal products, mushrooms, nuts and berries. These are also consumptive use values of renewable resources.
- Recreational opportunities on forested lands for local people and for tourists may vary across alternatives. They include hunting, camping, climbing, skiing, horseback riding, wildlife viewing, ATVs, snowmobiles, and many others. These are mostly nonconsumptive use values. Hunting is a consumptive use value and some of these activities can cause environmental damage, so they might be considered consumptive uses under certain circumstances.
- The quality and quantity of wildlife habitat may vary by alternative. This will affect consumptive uses, such as hunting, nonconsumptive uses, such as photography, and existence or bequest values of unique habitats or endangered species, primarily accruing to nonresidents (who do not have standing).
- The degree to which water and soil quality are affected by run off and nutrient deposition will vary across alternatives. This will affect consumptive uses through changes in land productivity and water quality (turbidity) (e.g. fishing, costs of water treatment) and nonconsumptive use values (e.g., hiking quality, catch and release fishing).
- Fire risk may vary across alternatives. Fire risk influences economic impact in at least two ways; through the five variable categories addressed above and through employment impacts, dealt with below. Higher fire risk implies lower productivity of forested land over time, as fire risk translates into a 1 in X chance of catastrophic loss in any given year. However, to a certain extent, more fire risk means more temporary jobs in fighting fires. Housing and feeding firefighters from outside the region (without standing) or employing local firefighters may be an important source of income for some strata of society, but is probably not a good substitute for less variable work and income from more traditional productive activities. Moreover, an analysis of the relative benefits of one economic development alternative over another that did not distinguish between short term (e.g., construction, fire fighting) and longer term (e.g., furniture maker, outfitter) income and employment effects would be a misrepresentation.

Many forest dependent communities are struggling to come to terms with high levels of unemployment and a labor force lacking the training needed to fill the employment opportunities that do exist or are generated as a result of activities on the land. As a result, it is common, if not universal, for CFOs to engage in job training programs.

- Skill development always "counts" in SBCA, as it increases the productivity of labor, thereby increasing the wage rate commanded in the marketplace, and typically, increases the number of hours worked.
- Job creation "counts" in communities where there is persistent unemployment because it can be expected that a new job will be taken by someone who has standing and that this job will not cause another job to go unfilled in the community.

Finally, but not least importantly, there are broader community implications of adopting one economic development path over another.

- In addition to the absolute size of economic costs and benefits from forest resource use, if the flow of economic benefits and costs is more or less variable over time, there may be social implications of one choice over another. The extreme case of this income variation is in seasonal employment where people from outside a region are hired to fulfill labor demands that cannot be absorbed locally. Tourism and agriculture provide examples of industries typified by strong seasonal variation in labor demand and, therefore, income. In forestry the local employment cycle may or may not be annual, depending on the chosen alternative.
- Community welfare indicators other than the number and quality of jobs and tax base may vary across development alternatives. Changes in some measures of community welfare provide indicators of important, but difficult to measure, improvements or declines in individual or family well being. If one or another alternative can be shown to result in fewer social problems (e.g., alcoholism, suicide, crime, poverty, school drop outs, vandalism) or more social benefits (e.g., volunteerism, altruism, enhanced community networks, enhanced community services), it may imply that individuals and families within the community have a greater sense of hope, power, influence, responsibility, connection to the land and the community. Evidence of improvements in these measures across community development paths would be preferred to other alternative paths ceteris paribus.

Measuring and comparing costs and benefits of economic development alternatives

Direct market analysis

Direct market price analysis is an appropriate technique to assess the consumptive use value of natural resources. It is best used when the good or service in question is commonly traded in the open market and can be considered the total value of the good, and if there are no important external effects in its production or consumption. That is, the price is generated through purchase behavior and price equals value.

For all forest based goods and services that have a well defined market, we can calculate the annual per acre value of production by multiplying the quantity of each of the goods by its respective price. The total value of market goods and services for a given alternative will be the sum of the values of the marketed goods and services derived from those lands multiplied by the number of acres under consideration. For some alternatives, wood products will be the only goods produced. For other alternatives, there may be less wood, but more other sorts of products. Contracts, grants and other remittances (pensions, annuities) obtained from private or public sources outside the community with standing are valued as if they were derived from export market transactions. Government contracts or services using money from within the jurisdiction are considered a transfer from the local taxpayer to the local project, are not new money, so do not "count" unless these expenditures can be shown to be superior to other potential expenditures of local public funds on community welfare grounds. Profit, value added or resource rent, is the market value less the cost to get the good or service to the marketplace. Profit is the increase in income that may or may not be reinvested in the local economy. Annual returns should be appropriately allocated over the project time horizon and discounted to arrive at a present value or net present value, when costs are included as well.

However, now consider the market for clear cut timber. The price of the timber harvested probably reflects the private returns to the wood, but not the social costs of the extraction process, which typically alters the visual quality of mountainsides and causes soil erosion and water pollution in runoff and settling ponds. In this case, the direct market price approach would overestimate the value of the industry to society and the derived value should be diminished by the value of the environmental damage caused by the industry. Some approaches to the valuation of the environmental damage could employ the direct price method, such as the cost of restoration, but

other aspects (e.g., damage to the view or downstream fish populations) would not be appropriately accounted for using this technique.

Skill development, training and education programs can be directly valued based upon the wage premium received due to the training. It is not considered appropriate to include additional hours worked at that wage premium as a benefit of the training program, due to the implicit tradeoff made between leisure and work time by the trainee. In addition, there is a question of for how long the effects of the job training program can be claimed. In most cases of adult continuing education, the effect of job skill training programs is considered to decay beginning two years after the end of the program and to have no effect 5 years post training. So, the local effect of a training program for jobs that currently exist but are not filled is equal to the number of people trained multiplied by the wage premium calculated over approximately 5 years, using a proper rate of decay, or credit taking, and discounted to arrive at a present value.

Job creation can be valued at the wage rate multiplied by the number of people employed when there is a high level of unemployment (some say in excess of 20%). Depending on standing, there may also be tax benefits from employing the unemployed. If unemployment is not particularly high, the social benefits of job creation should be reduced by some proportion based on the relative social value of reducing unemployment in that particular community.

In both the skill development and job creation programs there may be important self esteem, empowerment or broader social benefits missed by these human capital based calculations. As such, these programs are undervalued by this approach.

Indirect market techniques

Indirect market price analysis also allows the analyst to assess use values, but typically the value in question is embedded in the market price of another good or a closely related good is traded in the market. It can be that markets are malformed due to the features of the goods and services themselves or due to the institutions evolved for their management. The two most common indirect market valuation techniques are the travel cost method (TCM) and the hedonic price method (HPM).

The travel cost method (TCM) is a commonly employed analytical tool to facilitate understanding of the demand for tourism services. TCM employs surveys of tourists to obtain a profile of their actual trip expenditures and elicits sensitivity to an exogenous change in travel costs, demographic characteristics, and trip characteristics in order to derive a demand curve for tourism visitation. TCM allows us to extrapolate survey results to broader populations, infer willingness to pay for tourism services, explore the effect of local, national, or industry policy changes on tourism behavior and, therefore, economic impact. This technique could be applied to fishing, hunting, camping, bird watching and other tourist activities to the extent that their quality varies across the alternatives under consideration.

For example, the value of tourism to federal lands is far greater than the entry fee, the value revealed through direct price analysis. Thus, comparing timber sales to tourist visits based on direct price analysis will almost always tip the scales toward cutting trees, even if it is not the appropriate course of action. The value of the tourist visit to the federal land includes all of the expenditures made to have the experience including transportation, lodging, equipment and other services. Since many of these expenditures may not be in the locality of the federal lands, it is important to remember that local economic impact and total economic value are distinct concepts when standing is ascribed locally.

The hedonic price method is a commonly employed analytical tool used to understand the housing market, but it has applications to all products with multiple, separable and valuable features. The direct market price method gives the value of the house, but not the features that make up the value – safety, natural amenities, or public services. Using the hedonic price method, the value is not simply assigned directly to a house, but is based on things such as the number of bedrooms and bathrooms, the land size, the condition of the house, the proximity to a school, the view, traffic in the neighborhood, commute times, parks, and other open space, etc. This is the same

process that a person goes through in deciding whether a certain piece of property is desirable and if the price is acceptable.

Using this concept, an economist works backwards from the price paid to discover the value of one specific characteristic. For instance, if housing prices in a neighborhood increased by 3% per year for 10 years and after 10 years a park was established in the neighborhood and housing prices jumped 5 percent, 2% of the increase in housing value was due to the park all other things equal. Alternatively, comparisons can be made across neighborhoods or communities rather than over time to reveal similar information. Such techniques allow homeowners and local elected officials to evaluate the potential impacts of policies on both housing prices and the local tax base. To the extent that the development alternatives under consideration can be argued to directly affect the view, recreational opportunities, school or other public service qualities for which there is no direct market, it can be expected that those effects would be possible to reveal within the housing market.

Indirect market analyses have relatively high and often expensive data requirements. One alternative is to use completed studies to guide the assignment of these hidden values in a particular location. This is commonly done in cost benefit analysis in order to save time and money, but should be done with extreme care to ensure the transferability of these values derived from other situations to the focal location. The techniques involved here are variously labeled benefit transfer, meta-analysis, and off the shelf values.

Non market economic valuation techniques

For many issues concerning stewardship of natural environment there are few market signals of any kind to provide guidance as to its relative social value. This is particularly the case with expressions of nonuse value. However, without attempting to derive a usable economic value, it is tempting for policy makers to ignore the social worth of the environment or to assume that it is essentially zero. Nothing could be further from the truth as most often these non-market valuation techniques are criticized for attempting to place a value on the priceless; the infinitely valued.

In the market based methods, people reveal their preferences for environmental goods and services through their purchase decisions. With non-market techniques, consumers are enticed (in a survey) to state their preferences through construction of a hypothetical, or contingent, market. The contingent valuation method elicits a stated willingness to pay for, or willingness to accept payment to avoid a, change in environmental quality. Alternatively, the contingent behavior method elicits a stated change in behavior due to a hypothetical change in environmental quality. Both of these techniques are commonly used in conjunction with revealed preference survey methods, like the travel cost method, and are often applied to understand tourism and recreation behavior and the likely impact of policies to increase entry fees or tourist services in parks and protected areas.

Contingent valuation and behavior have enjoyed a great variety of applications, some of them rather high profile and typically involving the “jobs vs. the environment” debate. Endangered species habitat in the path of development seems to be a particularly common application for this technique as well as valuation of environmental benefits with substantial non-local value. Due to local standing, the size of the existence, bequest and option value will be relatively small compared to what might be derived from broader boundaries of analysis. Nonmarket valuation techniques have high and expensive data requirements and it may be appropriate to begin to understand their relative values in a particular location through the careful use of off the shelf values.

Economic (Export) Base Analysis

Since our scale of analysis is beyond the firm, but is still relatively narrow, an economic, or export, base analysis is appropriate to facilitate our understanding of the economic impact of the alternatives. An export base analysis traces the sale of goods and services to customers outside of the focal region (an export) through the local economy using an input-output model. Impacts can be traced in terms of income, jobs, and/or taxes generated and discussed in terms of direct, indirect and induced effects on the local economy. The direct effect is the amount of income and jobs generated by the sale of the export good. The indirect effect is the amount of local goods and services purchased in order to produce the export good (e.g., animal feed, machinery, legal services). The induced effects are the expenditures, made by local people who were paid in the production process of the export good,

otherwise unrelated to the production of that good or service (e.g., restaurants). The sum of the indirect and induced effects is called a multiplier. Leakage is the proportion of total expenditures that are nonlocal. It is in the interests of a community to reduce leakage and, thereby, increase local multipliers. Here we will use IMPLAN input-output software to trace the differential impacts of the focal economic development alternatives across the local economy.

Analysis and Results

In the spirit of benefits transfer studies, we searched the economic valuation literature for the features of forest stewardship discussed above that might vary across management regime and property institution. Table 2 provides an illustration of valuable forest stewardship characteristics, a qualitative assessment of the influence of management choices on that characteristic, the range of economic values found in the literature, and the sources of information where the values were published. All values have been corrected to commonly reflect 2005 US dollars, unless otherwise noted.

By identifying the reasonable ranges of values found in the current literature, local decision-making may be facilitated by comparing the published study's location to the focal locality along the more important descriptive and predictive dimensions. For example, if both locations are in the rural western United States and surround the private management of public forestlands, the published value is probably a reasonable substitute for conducting an independent, time consuming and expensive local study. If any of these dimensions vary, it is probably less dependable to adopt published values "off of the shelf." The long term vision is to create a model of community decision-making around forestland management that is transferable to other forest dependent communities facing similar economic development alternatives.

Consumptive uses: Wood products

The most obvious economic benefit of forestry is the harvesting and processing of commercial wood products. We reason that "no management" of either publicly or privately owned forest resources will result in no commercial wood products, while both community and industrial forestry will result in some valuable extraction of wood. However, the volume, time profile/rotation and variety (and, therefore, sustainability) of wood products harvested will vary substantially between community forestry and industrial forestry management models.

Industrial forestry is oriented toward large diameter timber extraction, commonly involving clear-cut harvesting. It is likely that wood extraction using the industrial management model is the most profitable method to harvest large diameter timber. However, it is also likely that this is practically the only clear advantage of this sort of one-dimensional management model. Raunikar and Buongiorno (2005) infer that non-industrial private forest (NIPF) landowners in the southern United States are willing to forgo as much as 60% of potential profits from timber extraction in order to maintain or increase stand diversity. Boltz et al. (2002) infer that industrial foresters are willing to pay \$19.81-\$40.50/m^3 to avoid diverse forest stands due to the additional costs of forest harvest associated with diverse forests (Table 2).

Timber concessions on public lands can be considered the minimum value that a private company would expect to reap in gross benefits from harvesting timber. Examining private clear-cut contracts within the state of Oregon reveals minimum bids of approximately \$400-430 per thousand board-feet of harvested timber, great variation in the realized rate of extraction per acre and, therefore, in total contract sizes (Oregon Department of Forestry, 2006). The inclusion of labor, transportation and other costs would get the analyst closer to the real supply side of the situation. Local impact comes in the form of local jobs and income, tax base, and any local multiplier effects due to the harvesting and processing of timber locally and its sale outside of the focal region.

Community forestry tends to be more closely associated with small diameter timber extraction and processing. The US Forest Service contracts or sells permits to clear dead trees from its forests in order to reduce fire risk (addressed later). These trees are commonly used for firewood and posts. Lodge pole permits cost \$0.03/linear foot and firewood permits in the Wallowa-Whitman National Forest cost \$5.00 per cord (USDA-Forest Service, 2006). A cord is 128 cubic feet or 2,662 lbs of wood. Community Smallwoods Solutions (CSS), a for-profit subsidiary of Wallowa Resources, sells cords of firewood for \$100-125 (Table 2).

Among the most useful economic development strategies for natural resource dependent communities is to create opportunities to add value to raw harvested products through processing. Distinct from industrial forestry, community forestry organizations actively seek such local opportunities to add value. CSS has created additional products using the small diameter wood extracted from federal forestlands. These value-added products include erosion control products (i.e., Flow Check at $40-55 per unit) and stream recovery products (i.e., River Logs, priced from $250-700) (Table 2).

Increasingly, there is evidence that people are willing to pay for products which can be certified to have been produced with certain desirable attributes. Among the attributes people have been shown to be willing to pay for include "locally made," "organic," "sustainable," and "environmentally friendly" products. O'brian (2004) found that consumers were willing to pay a small, but statistically significant, amount (up to 1%) for a marginal increase in the scores for the focal attributes (Table 2).

Consumptive uses: Non-timber products

Forests managed in an industrial model are not likely to provide favorable conditions for the harvest of non-timber products such as medicinal products, mushrooms, herbs, honey and other sap based products, nuts and berries. Industrial practices discourage ecological diversity and often clear away ground growth, reducing the potential for these potentially valuable products. On the other hand, community forestry and no management are likely to create such opportunities, provided access can be arranged.

Wallowa-Whitman National Forest charges $2.00 per day or $50 per year for the commercial (for anything other than personal use) harvesting of mushrooms within the forest (USDA-Forest Service, 2006). Here again, these constitute minimum values for those purchasing the permits. Harvesting for non-commercial use is free, potentially creating an indirect (but nonzero) local benefit in the form of tourism or for local production and consumption in lieu of imported purchased products. For example, Starbuck et al. (2004) found that visitors holding permits to harvest berries and mushrooms in the Gifford Pinchot National Forest (Washington) were willing to pay an additional $38.36 per day to continue to enjoy gathering mushrooms and berries (Table 2).

Nonconsumptive use and nonuse values: Wildlife habitat, Biodiversity, & Recreation

The nonconsumptive use and nonuse values created through community forestry relative to no management and industrial management may differ substantially. However, since our interest is in local economic impact rather than total economic value, we have limited standing to only local people. Since a very high proportion of existence and bequest nonuse values accrue to people who are nonlocal, it is important to reiterate this point, as many arguments for the preservation of forest biodiversity are driven by these substantial potential benefits to nonlocal people. As a result, the differences in nonconsumptive use and, particularly, nonuse economic value generated by different management approaches will appear less stark.

In contrast to industrial forest management, community forestry promotes old growth forests associated with higher quality wildlife habitat and greater biological diversity (Borderlon, et al., 2000). In addition, community forestry will actively manage for these desirable attributes through forest thinning, reducing the risk of fire, insect infestations, diseases and other forest health problems (Oliver, 2003), unlike the no management option. These actions will contribute to recreation values for local residents and tourists alike as well as contributing to nonuse values at levels substantially greater than either industrial forestry or the no management alternative will produce (Oliver, 2003).

The Cedar River Group (2002) found that Washington state residents were willing to pay an average of $89.29 per household-year to suspend industrial logging activities on Blanchard Mountain. Kramer et al. (2003) found that residents of the Southern Appalachian Mountains were willing to pay $55.86 per household-year to protect public spruce-fir forests from insect infestations or other forest health damaging events. The authors were able to identify $6.27 of the $55.86 as use value, $16.77 as bequest, and $31.84 as existence value for forest health. Walsh et al. (1990) found that Colorado residents were willing to pay some $92.16 per household-year to maintain healthy local public forest density. The use, option, existence and bequest values associate with the Colorado valuation were $25, $20, $20 and $27, respectively (Table 2).

Table 2. Relative economic value of forest resources across management alternatives

	No mgmt	Industrial Forestry	Community Forestry	Lit Based Value Range	Units	Related Literature
Raw wood products – public	0	+	+	0.03-5.00	linear foot or cord	29
Raw wood products-private	0	+	+	50-125	Cord or pallet	6
Processed & certified wood products	0	-	+	0.015-0.041	US$ per attribute point	23
Non-timber products	+/0	-	+	38.36	Consumer surplus per day-trip	27
Non-timber products	+/0	-	+	2/day, 50/year	US$ commercial permit price	29
Stand diversity - Producer's value	0	-	+	60	% of foregone revenue	3, 5, 26
Stand diversity - Consumer's value	0	-	+	9.79-20.01	shadow price per m^3	2, 3, 5
Recreational opportunities	+/0	+/-	+/0	4.15-63.79	consumer surplus per day-trip	20, 22
Improved forest quality	0	-	+	55.86-92.16	WTP per household	3, 5, 17, 24, 30
Suspend logging	0	-	+	89.29	WTP per household	4, 24
Wildlife habitat	+/0	+/-	+	19-148	individual surplus per season	10, 31
Fire prevention & risk	0	+/0	+/0	44.45-722.20	WTP per household	1, 16, 20
Recreation & prescribed burns	0	+/-	+/-	12.73-166	consumer surplus per trip	1,10,11
Recreation & crown Burns/Wildfires	0	+/-	+/-	7.93-123.74	consumer surplus per trip	1,10,11
Δ in jobs, wildfire-Local	0	-	+/-	18-66	jobs lost due to fire	1,3,5,28
Δ in earnings, wildfire–Local	0	-	+/-	0.59-1.15	US$ million lost due to fire	1,3,5,28
Δ in jobs, prescribed burn–Local	0	-	+/-	6	jobs gained due to fire	1,3,5,28
Δ in earnings, prescribed burn–Local	0	-	+/-	0.12	US$ million gained due to fire	1,3,5,28
Δ in jobs, wildfire-Statewide	0	-	+/-	1,240-1,941	jobs lost due to fire	1,3,5,28
Δ in earnings, wildfire-Statewide	0	-	+/-	23.31- 41.39	US$ million lost due to fire	1,3,5,28
Δ in jobs, prescribed burn-Statewide	0	-	+/-	186	jobs gained due to fire	1,3,5,28
Δ in earnings, prescribed burn-Statewide	0	-	+/-	3.97	US$ million gained due to fire	1,3,5,28

Δ indicates “change.” (+) denotes positive values, (-) denotes negative values, (0) denotes neutral or no effect.

Forests provide recreational opportunities for residents and tourists alike. The quality and quantity of recreational opportunities may vary by management regime. The economic benefits of recreation are somewhat difficult to trace since, often, when activities are undertaken on public lands, entry fees do not come close to reflecting the total willingness to pay for the recreational experience. Again, the economic value of the recreational experience should include indirect local expenditures on food, drink, hotel, and supplies in addition to the direct expenditures at the recreation site.

Loomis and Crespi (1999) found the average daily value of camping, backpacking and hiking, picnicking, and stream fishing on federal forest lands was $13.97, $24.65, $18.67 and $27.97, respectively. Wilman (1984) finds that hunters would be willing to pay approximately $35-278 per person-day for improvements in deer habitat quality. Table 3 illustrates the range of consumer surplus values (the additional amount that people would have been willing to pay but were not required to) calculated by McCollum et al. (1990) across ten focal regions across the United States. Substantially lower values can be expected for industrial forestry, while somewhat lower values can be expected for the no management option given the arguments provided above (Table 3).

Table 3. Value of outdoor recreation on federal forestlands, per person-day

Activity	Consumer Surplus
General recreation	$5.70 - $16.91
Developed camping	$5.13 - $26.12
Primitive camping	$4.15 - $32.97
Swimming	$14.84 - $40.33
Coldwater fishing	$13.31 - $42.91
Warm water fishing	$18.75 - $19.48
Day hiking	$26.34 - $63.79
Big game hunting	$7.45 - $19.53
Sightseeing	$10.14 - $35.98
Recreation in wilderness areas	$4.26 - $24.00

Source: McCollum et al., 1990. Values in US$ 2005.

Fire prevention, risk and economic value enhancement/mitigation

Fire reduces or wipes out all economic values derived from forested lands. Management practices that reduce the frequency or magnitude of fire losses effectively increase (avoid loss of) the economic values discussed above. Industrial and community forestry can be expected to mitigate fire risk, no management can be expected to increase fire risk. Bergeron et al. (2004) found that even-aged (industrial) forests are more profitable than diversified forests when fire risk is low and community forestry is more advantageous when fire risk is high. The Oregon Department of Forestry reports that fire incidence is 30% over the historical average due to a prevalence of ground cover. Common community forestry practices would therefore be effective at reducing fire risk relative to industrial forestry or the no management alternative.

Loomis and Gonzales-Caban (1998) found that Oregon residents were willing to pay $44.55-132.89 per household-year to reduce fire risk by 50% in old growth forest areas. Kaval (2004) and Loomis (2004) investigated the effect of fire risk on homeowners on the forest fringe in Colorado. Kaval (2004) found that homeowners were willing to pay $559.10-722.20 to reduce the fire risk to their homes, while Loomis (2004) found that homes in a community near to where a fire had recently struck experienced of reduction in value of 15-16%, or perhaps $30,000-60,000 per house in the study area. Reductions in home value not only have personal wealth implications, they also result in lower tax revenues with which to fight fires or create a better community.

Hesseln et al. (2003, 2004) and Starbuck et al. (2006) investigated the effect of prescribed burns, as a wildfire risk mitigation technique, and crown fires on recreation demand in Colorado, New Mexico and Montana. They found that hikers and bikers positively valued the effect of prescribed burns ($12.73-166.00 per person-trip) and negatively valued crown fires ($7.93-123.74 per person-trip), providing support for forest thinning, deadfall

clearing and other common practices in community forestry relative to no management. Starbuck et al. (2006) found that temporary forest closures due to wildfire cost the state of New Mexico approximately $3 million and 66 jobs during the 2001 summer season. The initial damage done to the forests due to the fire created a long term and economically important reduction the recreational value of the site.

Some studies could be used to show an increase in economic activity due to fire. That is, fighting fires provides additional external sources of funds (e.g., FEMA, USDA-Forest Service) employment to local people, brings fire fighters, who stay in hotels and spend money on local services, to the community. However, care should be taken to avoid counting natural disasters as economic benefits. Clearly, economic activity derived from calamitous events is short term and cannot be sustainable.

The current body of literature provides a clear illustration of the categories and relative magnitudes of impacts of community forestry relative to other forest management alternatives. However, it clearly falls short in direct application to particular cases or communities. By means of illustration, we provide a conservative empirical analysis of the likely economic impact of community based forestry in Wallowa County, Oregon and Delta and Montrose Counties, Colorado.

Local impacts of community forestry: Wallowa Resources, Wallowa County, Oregon

The economy of Wallowa County, Oregon

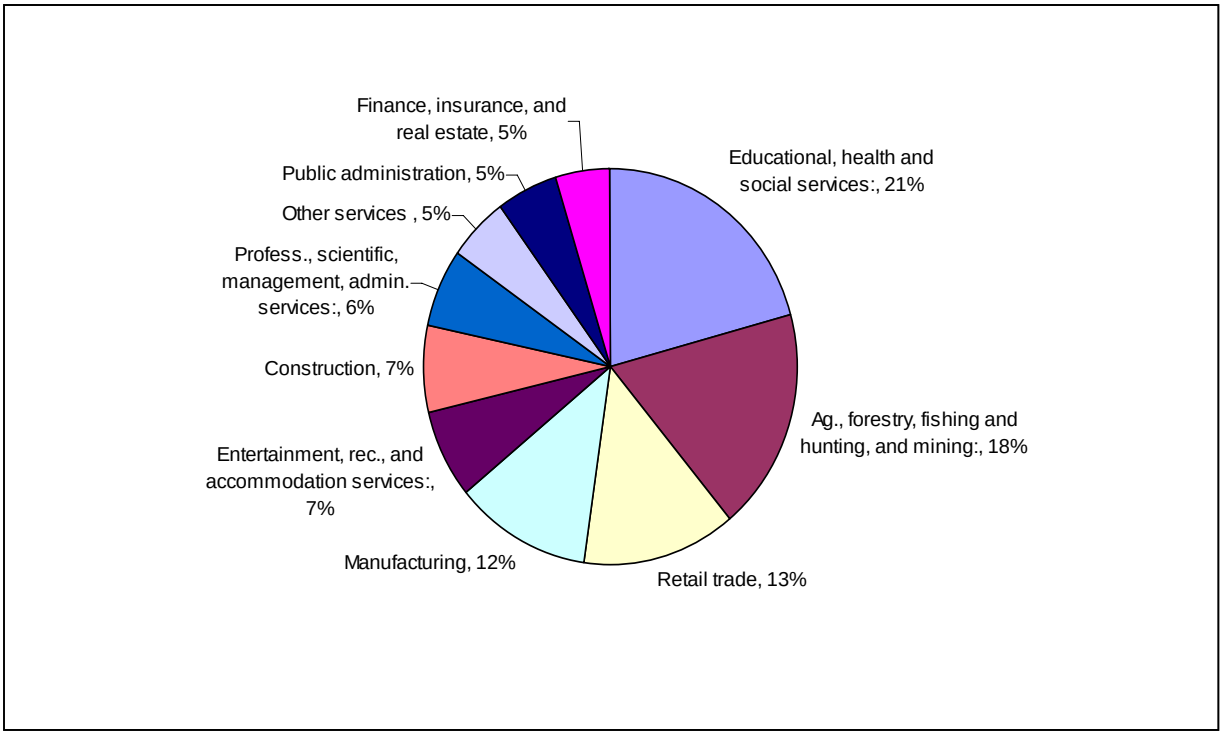
Wallowa County occupies two million acres in the northeastern corner of Oregon. The Wallowa-Whitman National forest covers nearly ½ of the land within the county. The county currently has a human population of about 7,100 residents, 5,100 over the age of 25 yrs. The county population is growing slowly (0.4% per year), more slowly than the state of Oregon or of the United States more generally. Some 87% of the county population has finished high school and 20% holds a college degree, similar to many other rural counties of the United States. The nearest commercial airport and regional population center is about 1.5-2hrs away. As a result of both its isolated location and the dominance of public lands, the county is culturally and economically highly resource dependent, particularly in forest resources.

The employment and income profile of Wallowa County reflects this natural resource dependence. According to U.S. Bureau of Economic Analysis data (US Bureau of Labor, 2006), as generated by the Economic Profile System (EPS, 2003), the education and health sector is the largest local employer (21%; 593 jobs), followed by agriculture, forestry, fishing, hunting and mining (18%; 512 jobs) (Figure1).

Employment (and, therefore, income) seasonality is a characteristic of natural resource based industries and a challenge for communities with relatively undiversified local economic bases. Wallowa County suffers from both high variation and high average unemployment, resulting in lower average household incomes, relative to the state of Oregon and the nation as a whole. Some 20% of Wallowa's adult population reported earnings below the poverty line in 1999 (EPSc, 2003). Average household income in Wallowa County has increased from $17,817 in 1970 to $23,219 in 2003 (in 2003 dollars) (EPS, 2003). Average household income in Oregon and the United States was $28,734 and $31,472 (EPS, 2003).

An input-output model of an economy facilitates understanding of the linkages and interdependencies among local economic sectors. A look at the entire Wallowa County economy will help us to later understand the role of Wallowa Resources within the county economy. IMPLAN, a popular input-output based software tool for economic analysis, is used for this part of our analysis.

Figure 1. 2003 Wallowa County Employment by Sector



Source: Economic Profile System, 2006.

IMPLAN uses 509 industrial sectors which are based on the North American Industry Classification System (NAICS). These industries can then be aggregated using varying levels of either the NAICS categories or their predecessors, the Standard Industrial Classification (SIC) codes. County level data aggregations and two-digit NAICS codes have been used for this analysis, due to the significant potential for disclosure problems in a relatively undiversified rural economy, as well as for the likely principal level of interest in the activities of Wallowa Resources. For each industry, IMPLAN calculates the total output, employment, total value added and other economic impacts. This allows for a general overview of the economic environment of a region.

Table 4 provides an overview of the Wallowa County economy as generated using IMPLAN. For Wallowa County, total direct industry output, or out of county sales, is about $300 million, based upon the most recent data available (2002). Agriculture, Forestry, Fishing and Hunting is identified as the most important economic sector in the county, generating some $73.27 million in industry output (about 25% of the total economy), 962 jobs and more than $9 million in employee wages and salaries. Government, construction and manufacturing are also important sources of local employment and income, each comprising approximately 14% of the Wallowa County economy in 2002.

IMPLAN also calculates multipliers, or the distribution of economic impact through an economy due to a dollar of sales outside of the economy or the introduction of a dollar of new money to the economy in the form of output, income and employment. Direct economic effects have to do with economic activity directly associated with the production and sales of goods and services. So, the machinery, labor, and fuel required to cut down trees and to make them into pulp, poles, or boards are economic activities directly associated with the production of wood products. Direct economic impacts are multiplied through the economy by means of indirect and induced effects. Indirect effects are local economic activities stimulated by the production of the direct economic activities. So, locally purchased accounting, legal, and transportation services, associated with the sales of wood

products are indirect effects of wood production. Induced effects are the economic purchases unassociated with the good produced, but that are generated due to individuals' association with the production process. So, sawyers are paid for their work. They use their salaries to purchase homes and automobiles, to go to the grocery store, and to local restaurants. If the sawyers spend their money locally, there is an induced economic effect of their spending. Money spent on nonlocal goods and services is called leakage.

Type I multipliers are the indirect effects of production processes on local income and employment. Type II multipliers are the indirect plus the induced multipliers. Multipliers increase with the complexity of the goods or services produced (value added), the size and complexity of the locality, and the amount of local purchases in the production process (leakage). As a result, rural economies based upon extraction of raw natural resources tend to demonstrate relatively low multipliers. Including a Type II multiplier of 1.41, the indirect and induced effects of $299 million in economic output is approximately $123 million and the estimated size of the Wallowa County economy is an estimated $422 million.

Table 4. IMPLAN Total Output Summary for Wallowa County, Oregon, 2002

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Ag, Forestry, Fish & Hunting	73.271	962	9.105	2.814	16.889	1.759	30.568
Utilities	5.169	13	0.992	0.172	1.963	0.560	3.687
Construction	42.087	342	14.885	3.300	1.638	0.236	20.058
Manufacturing	43.305	255	7.033	4.002	4.059	0.757	15.851
Wholesale Trade	1.632	12	0.585	0.057	0.262	0.277	1.181
Transportation & Warehousing	7.800	97	2.619	0.522	0.353	0.237	3.731
Retail trade	23.904	385	7.289	3.517	3.502	3.658	17.967
Information	3.956	33	0.771	0.049	0.340	0.094	1.255
Finance & insurance	10.802	82	2.813	0.107	3.973	0.129	7.022
Real estate & rental	3.731	60	0.368	0.250	1.511	0.386	2.515
Professional-scientific & tech services	4.365	85	1.421	1.241	0.455	0.086	3.203
Administrative & waste services	1.722	23	0.467	0.050	0.218	0.049	0.783
Educational services	0.557	14	0.200	0.046	0.049	0.011	0.306
Health & social services	7.615	171	3.277	1.503	0.780	0.074	5.634
Arts- entertainment & recreation	4.379	57	0.525	0.914	0.315	0.209	1.964
Accommodation & food services	8.083	245	2.198	0.352	0.804	0.438	3.791
Other services	11.665	410	4.655	1.630	0.196	0.104	6.585
Government & non NAICS	45.189	491	21.741	0.000	15.372	1.919	39.031
Totals	299.232	3740	80.944	20.528	52.676	10.984	165.132

* millions of dollars.

Our focus here is on estimating the effect of community based forestry organization on local economies. Since many CBF activities are likely to directly or indirectly affect the forestry industry, we provide a focused view of the forestry and logging and its associated service sector within the broader agriculture, forestry, fishing and hunting industrial sector. In 2002, the Forestry and Logging sectors employed 269 residents and generated a total of $24.571 million. Proprietors earned $2.436 million from this sector and industry value added, or profits that can be reinvested locally or externally, totaled some $8 million.

Table 5. Total Output Summary for Forestry and Logging Sectors in Wallowa County, Oregon (IMPLAN), 2002

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Forestry & Logging	19.689	83	2.343	2.078	3.725	0.26	8.407
Ag & Forestry Services	4.882	186	3.821	0.358	-0.919	0.055	3.31

*millions of dollars

Tables 6 and 7 show the total output and employment impacts after adjusting for multiplier effects. Based upon a local multiplier of 1.88 in the forestry and logging sector and 1.51 in the agriculture and forestry services sector, the total output impact is $44.400 million. After adjusting for the additional employment generated by the sector the total employment impact was an estimated 535 jobs.

Table 6. Output Multipliers and Total Output Impacts for Wallowa County (IMPLAN)

Industry	Direct Effects	Indirect Effects	Induced Effects	Total	Type II Multiplier	Total Output ($ millions)
Forestry & Logging	1	0.697	0.184	1.882	1.882	37.049
Ag & Forestry Services	1	0.158	0.348	1.506	1.506	7.351

Table 7. Employment Multipliers and Total Employment Impacts for Wallowa County (IMPLAN)

Industry	Direct Effects	Indirect Effects	Induced Effects	Total	Type II Multiplier	Total Employment
Forestry & Logging	4.211	8.374	3.105	15.690	3.726	309
Ag & Forestry Services	38.101	2.269	5.857	46.227	1.213	226

While export base analysis examines the economic environment of a county, a shift share analysis provides a view of the economic evolution of a county relative to the broader region and the nation as a whole. It helps us to understand what rate of growth might be expected as a result of national or regional trends relative to local conditions. That is, local income and job growth of 14% may be viewed as positive. However, if we know that Oregon demonstrated 20% growth and the United States 21% over the same period, for example, our enthusiasm may be tempered by providing a context for our understanding of the numbers.

Table 8 provides a shift share analysis of Wallowa County over the period of 1990-2005. The United States economy grew 20.9% over the 15 yr period. Therefore, the average county economy in the United States grew by 20.9% from 1990-2005. Had Wallowa County followed general national trends, we might have expected a 20.9% increase in local jobs, or 456 jobs distributed over its 11 principal industrial sectors, over the 15 yr period (see National Growth in Table 8).

Unfortunately, the industries that comprise the Wallowa County economy did not follow the national average trends. Although professional and business services showed an increase of 39.4% nationwide and education and health services increased by 20.9% over the period, manufacturing declined by 41.4% and natural resources and mining declined by 22.4% nationwide over the period. As a result, if Wallowa County's industrial mix remained in 2005 as it had been in 1990, we might have expected a net decline in 147 local jobs over the period based on national trends (see Industrial Mix in Table 8).

Table 8. Shift Share Analysis for Wallowa County, 1990 – 2005

	National Growth		Industrial Mix		Competitive Share	
Sector	Percent	Jobs	Percent	Jobs	Percent	Jobs
Trade, Transportation and Utilities	20.9	85	-7.7	-31	8.7	35
Other Services	20.9	10	3.7	2	71.3	35
Construction	20.9	18	17.6	15	30.9	26
Leisure and Hospitality	20.9	31	15.4	23	13.0	19
Professional and Business Services	20.9	9	39.4	17	16.4	7
Public Administration	20.9	41	-8.7	-17	-3.6	-7
Information	20.9	7	-10.6	-3	-29.1	-9
Financial Activities	20.9	23	-3.2	-3	-14.0	-15
Manufacturing	20.9	69	-41.4	-137	-12.8	-42
Education and Health Services	20.9	78	20.9	78	-18.9	-70
Natural Resources and Mining	20.9	85	-22.4	-91	-42.8	-174
Total		456		-147		-195

The competitive share describes how a community's unique local characteristics contribute to regional employment gain or loss. In order to fully understand this measure, it may be best to explain how the competitive share is calculated. To determine the competitive share of jobs in Wallowa County, the employment in the base year (1990) was multiplied by the difference between the local and national industry growth rates. The sum of the results for each individual industry represents the competitive growth component for the entire local economy. According to the local share component, 195 of all jobs lost in Wallowa County are attributed to the county's relative competitive position. The county created a smaller share of employment growth than the nation did, on average. Moreover, Wallowa suffered a net loss of some 48 jobs relative to what we might have predicted given its historical industrial mix. That is, the industries that make up the Wallowa economy are generally in decline and Wallowa has done worse than other communities made up of those same industries. Wallowa is doing better than expected in trade, transportation and utilities, other services, construction, public administration, and information. However, the precipitous decline of manufacturing, education and health services, and particularly extractive natural resource industries in the county has driven the overall negative impression of the economy.

While Shift Share Analysis examines comparative advantage, the Location Quotient (LQ) is an economic tool used to identify the industries in which a region is likely to be self-sufficient, a net exporter or a net importer. The LQ compares the proportion of the local population employed by an industry to a national or state average. For example, if the LQ of a local industry is equal to 1, then the same percentage of people is employed in that industry at a regional level as at the national level. Table 9 compares the state of Oregon and Wallowa County to the proportion of people employed in these locally important sectors nationwide for 2001 and 2005. LQs only calculate private sector activities. It is likely that the state and county are more similar than the county and the country. Of course, the LQ assumes that labor productivity is similar across the focal political jurisdictions and the interpretations that generally follow imply that the country is essentially oriented toward zero net trade (exports equal imports).

As a general rule of thumb, an LQ equal to 1 indicates self-sufficiency, while an LQ greater than 1.25 may indicate that the region exports the good or service and LQ of less than 0.75 may indicate that the region imports the good or service. Although, Oregon and Wallowa County maintain a very similar employment profile to the rest of the nation in across a variety of sectors, there are several important differences. First, as might be expected, the state of Oregon has 8-9 times as many people employed in forestry and logging than the national average. Wallowa County has 7 times as many people as a proportion of population employed in forestry and logging than does Oregon and more than 60 times the national average.

The Forestry and Logging sector includes industries involved in the growth and harvesting of timber while the Logging sector includes those industries solely involved in the cutting, transporting or chipping of timber. This

production is clearly not consumed locally, but rather is exported from the region. Similarly, the extractive natural resource and mining industries are represented at more than twice the national average in Oregon and five times the national average in Wallowa County. On the other hand, it appears that Wallowa County is importing or contracting out many of its service needs, particularly business and professional services, information, health and educational services. Since these industries can be attractive features of a community and can also provide relatively highly paid, year round, and resource independent professional employment to a community, it may be of particular interest to Wallowa County to try to understand the conditions leading to this potential gap. The NC in the unclassified sector and the ND in the logging sector for Wallowa indicates that the LQ for this industry is non-calculable (NC); data are not available, or not disclosed (ND), due to fewer than three reporting businesses.

Table 9. Location Quotient for Oregon and Wallowa County, 2001 and 2005

Industry	State of Oregon		Wallowa County	
	2001	2005	2001	2005
Base industry: Total, all industries	1	1	1	1
Natural resources & mining	2.21	2.26	5.51	5.24
Construction	0.96	0.99	1.38	1.32
Manufacturing	1.07	1.14	0.82	1.03
Trade, transportation, & utilities	1.01	1.01	1.11	1.23
Information services	0.90	0.88	0.65	0.57
Financial activities	0.90	0.87	0.93	0.93
Professional & business services	0.88	0.88	0.27	0.30
Education & health services	0.95	0.93	0.71	0.66
Leisure & hospitality	1.02	0.99	1.55	1.15
Other services	1.14	1.11	1.43	1.47
Unclassified	0.26	0.19	NC	NC
Forestry and logging	8.40	8.87	50.25	66.26
Logging	8.62	9.25	ND	ND
Support activities for forestry	2.04	2.14	4.33	51.18

Wallowa Resources

Wallowa Resources was created as a non-profit organization in 1996. WR operates primarily as a facilitator, educator and entrepreneur in land and forest resource based economic development in Wallowa County, Oregon. Contract and grant funding for the organization have come from both governmental and private agencies. The United States Forest Service, as well as several other government agencies, has contracted WR to provide a variety of services. Private donations made up about 15% of the budget of the organization. WR has undertaken a number of projects intended to rejuvenate or restore the ecology of Wallowa County, create employment opportunities for local entrepreneurs and laborers, as well as increase environmental awareness within the community. Wallowa Resources believes that through community forestry, the social, ecological and economic goals of the organization for the community can be realized.

Wallowa Resources has taken on a variety of activities within the county. The activities can be broadly categorized as educational, natural resource management focused field activities, forest product business ventures, program facilitation and organizational administration. WR offers adult education programs to community members and short courses to visiting students from regional universities and other educational programs to local primary and secondary students. These programs include fire training and organic farming for adults and an outdoor learning school and science education for children. The organization is also involved in field work where members of the community can take part in restoration projects or value-added business ventures. While it is difficult to fully capture the economic impact of these programs, input/output modeling can quantify some of the economic effects of the programs within the community.

By using input/output modeling, the direct, indirect and induced impacts of expenditures can be quantified. Wallowa Resources brings in financial resources from a variety of sources and spends them locally across its portfolio of projects. These 40 various activities have been grouped according to approximate function or focus

and assigned a North American Industry Classification System (NAICS) code or codes. This code is then used to determine which sector to input the yearly expenditures. For example, the various field and restoration projects Wallowa manages have been assigned a NAICS code of 92, administration of conservation programs. From this, the total expenditures can then be input into the model and traced through the economy. Table 10 lists the activity or program managed by Wallowa Resources, the assigned NAICS code, a description of this code and the total expenditures in 2005.

Table 10. Description of Wallowa Resources Activities

Wallowa Resources Activity	NAICS code	Description	Dollars Spent
Field and Restoration Work	92	Admin. of Conservation Programs	$413,114
Educational Programs	611	Profess. & Mgmt. Develop. Training	$67,404
General Office and Project Management	561	Office Administrative Services	$586,087
Field Buildings	321	Prefab. Wood Building Manufacturing	$184,506
Field Monitoring Activities	115	Support Activities for Forestry	$62,828
Field- Small Diameter Wood	113	Timber pole cutting	$7,971
		Total 2005 Expenditures	$1,321,911

While NAICS codes can be specified to various levels of sub sectors, IMPLAN only recognizes sectors to the three-digit level. As a result, the activities have been broadly classified. After using this classification, the aggregated expenditures can then be input into the IMPLAN model. Table 11 illustrates the total impacts of all the expenditures. The top twenty impact sectors are reported here. In total, Wallowa Resources injected $1,321,910 into the county economy on projects and business operations in 2005. When indirect and induced effects (totaling $512,659) are accounted for, the total estimated output impact becomes $1,834,569, or about ½ of one percent of the total county economy. For every dollar that Wallowa Resources brought into the county economy, an estimated additional 28 cents of economic activity was generated in Wallowa County. In 2005, Wallowa Resources had the largest total local economic effect through its administration and management of these substantial external funds. As might be expected, it also had a sizeable effect on the forestry, logging, wood products and associated services and educational services sectors. This same analysis can be performed for employment. Table 12 demonstrates that WR created or otherwise accounted for about 29 jobs in Wallowa County in 2005, focused in the same sectors as its primary economic impacts.

If each of the groups of activities were broken out, further insights into the relative economic impact of different sorts of CBO programs can be illustrated Tables 13 and 14 show the output and employment impacts of the organizational administration expenditures of Wallowa Resources' projects. Administrative expenditures relate to the daily operation of the organization. In 2005, Wallowa Resources spent $586,087, which had total impact of $794,270. These expenditures supported a total of 15.3 jobs within the county in 2005. Each dollar of contract and grant funds brought in by WR and used for program administration activities generates an estimated 36 cents in additional economic activity in the local economy, principally through the purchase of professional and technical services.

Field expenditures are primarily money spent on restoration and stewardship programs (Tables 15 and 16). This category is considered to be government and non-NAICS. In general, the government oversees the administration of conservation programs, but because Wallowa Resources acts similarly to the government when overseeing these projects (does not derive profit) this is a fitting description. Wallowa Resources spent $413,114 in 2005 on these projects. This expenditure had a total impact of $516,729 within the local economy. Field projects directly generated 4.5 jobs and had a total employment impact of supporting 6.2 jobs. However, the estimated spillover or multiplier effects of these activities are considered relatively modest. Each additional dollar spent in this sector generates approximately 25 cents in additional local economic activity, mostly through the local spending of salaries and wages associated with the field expenditures.

Table 11. Output Impact of Wallowa Resources Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	586,087	10,669	933	597,689
495	92 Government & non NAICS	413,114	14,257	64,486	491,857
112	321 Wood Products	184,506	29,557	405	214,467
18	115 Ag & Forestry service	62,828	7,034	258	70,120
461	611 Educational services	67,404	244	1,787	69,436
14	113 Forestry & Logging	7,971	58,264	118	66,353
437	541 Profess.- scientific & tech service	0	25,016	5,027	30,043
481	722 Food service & drinking places	0	6,524	17,351	23,875
430	521 Monetary authorities	0	10,089	11,189	21,278
30	221 Utilities	0	8,265	8,225	16,491
482	811 Repair & maintenance	0	7,343	8,220	15,563
401	441 Motor vehicle& parts dealers	0	3,875	11,258	15,133
431	531 Real estate	0	9,393	5,413	14,806
394	484 Truck transportation	0	10,319	4,129	14,448
464	621 Ambulatory health care	0	71	14,335	14,406
420	515 Broadcasting	0	8,151	5,629	13,780
1	111 Crop Farming	0	10,344	2,970	13,314
33	230 Construction	0	10,428	1,753	12,180
405	445 Food & beverage stores	0	2,841	9,019	11,861
491	813 Religious- grantmaking- & similar	0	3,235	5,968	9,203
	Total	1,321,910	280,026	232,633	1,834,569

Table 12. Employment Impact of Wallowa Resources Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	11.9	0.2	0	12.1
495	92 Government & non NAICS	4.5	0.2	0.7	5.3
18	115 Ag & Forestry Services	2.4	0.3	0	2.7
461	611 Educational service	1.7	0	0	1.8
112	321 Wood Products	1.1	0.2	0	1.2
481	722 Food service & drinking places	0	0.2	0.5	0.7
437	541 Professional- scientific & tech service	0	0.5	0.1	0.6
464	621 Ambulatory health care	0	0	0.4	0.4
491	813 Religious- grantmaking- & similar	0	0.1	0.2	0.4
14	113 Forestry & Logging	0	0.2	0	0.3
1	111 Crop Farming	0	0.1	0	0.2
401	441 Motor vehicle & parts dealers	0	0.1	0.2	0.2
405	445 food & beverage stores	0	0.1	0.2	0.2
411	453 Misc retailers	0	0.1	0.1	0.2
431	531 Real estate	0	0.1	0.1	0.2
479	721 Accommodations	0	0.1	0.1	0.2
482	811 Repair & maintenance	0	0.1	0.1	0.2
494	814 Private households	0	0	0.2	0.2
12	112 Livestock	0	0.1	0	0.1
33	230 Construction	0	0.1	0	0.1
	Total	21.6	3.4	3.9	28.9

Table 13. Output Impact of Administrative Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	586,087	9,342	360	595,788
495	92 Government & non NAICS	0	8,531	24,865	33,396
437	541 Prof.- scientific & tech service	0	18,880	1,938	20,819
481	722 Food service & drinking places	0	5,832	6,690	12,522
430	521 Monetary authorities	0	7,654	4,314	11,968
420	515 Broadcasting	0	6,945	2,171	9,116
1	111 Crop Farming	0	6,662	1,145	7,807
431	531 Real estate	0	5,512	2,087	7,600
401	441 Motor vehicle & parts dealers	0	3,106	4,341	7,447
30	221 Utilities	0	4,255	3,171	7,426
	Total	$586,087	$118,484	$89,699	$794,270

Table 14. Employment Impact of Administrative Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	11.9	0.2	0	12.1
437	541 Professional- scientific & tech service	0	0.4	0	0.4
481	722 Food services & drinking places	0	0.2	0.2	0.4
495	92 Government & non NAICS	0	0.1	0.3	0.4
1	111 Crop Farming	0	0.1	0	0.1
398	491 Postal service	0	0.1	0	0.1
399	492 Couriers & messengers	0	0.1	0	0.1
401	441 Motor vehicle & parts dealers	0	0.1	0.1	0.1
405	445 Food & beverage stores	0	0	0.1	0.1
411	453 Misc retailers	0	0	0	0.1
	Total	11.9	1.9	1.5	15.3

Table 15. Output Impact of Field Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
495	92 Government & non NAICS	413,114	2,084	22,444	437,641
481	722 Food service & drinking places	0	73	6,039	6,112
33	230 Construction	0	4,706	610	5,316
464	621 Ambulatory health care	0	1	4,989	4,990
430	521 Monetary authorities	0	649	3,894	4,543
401	441 Motor vehicle& parts dealers	0	560	3,918	4,478
427	524 Insurance carriers & related	0	2,685	1,453	4,138
491	813 Religious- grantmaking- & similar	0	1,922	2,077	3,999
30	221 Utilities	0	1,102	2,863	3,965
437	541 Professional- scientific & tech service	0	2,061	1,750	3,811
	Total	$413,114	$22,649	$80,966	$516,729

Table 16. Employment Impact of Field Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
495	92 Government & non NAICS	4.5	0	0.2	4.8
481	722 Food service & drinking places	0	0	0.2	0.2
491	813 Religious- grantmaking- & similar	0	0.1	0.1	0.2
401	441 Motor vehicle & parts dealers	0	0	0.1	0.1
405	445 Food & beverage stores	0	0	0.1	0.1
427	524 Insurance carriers & related	0	0	0	0.1
431	531 Real estate	0	0	0	0.1
437	541 Professional- scientific & tech service	0	0	0	0.1
464	621 Ambulatory health care	0	0	0.1	0.1
494	814 Private households	0	0	0.1	0.1
	Total	4.5	0.3	1.4	6.2

Wood product expenditures include the value added goods produced by Community Smallwood Solutions (Tables 17 and 18). The category of wood product manufacturing includes lumber, plywood, veneer, and prefabricated wood for structures. Wallowa Resources spent $184,506 which had an additional impact of $138,528, or about 75 cents of additional economic activity for each dollar spent in 2005. The need to purchase equipment and machinery in addition to labor and the potential for adding value to raw wood products locally are what drive the multiplier for this sector higher than for administrative expenditures or field production. Wood product manufacturing had a total economic impact of $323,034 in Wallowa County, directly created 1.1 jobs in the sector and indirectly created 0.2 jobs in the Wood Products, Forestry and Logging, and Agriculture and Forestry Services sectors, as well as 0.1 jobs in the Truck Transportation sector.

Wallowa Resources focuses strongly on educational programs for local community members (Tables 19 and 20). Because our model specification is limited to the three-digit sectors, the many educational programs have been aggregated into a single sector. The expenditures for educational programs had a total output impact of $90,936, including an estimated output multiplier of 1.35, and a total employment impact of 2.1 jobs. This does not take into account the value of the skills learned or emotional impact such as confidence or leadership. Therefore the impact of the educational programs administered by Wallowa Resources is greatly underestimated.

Table 17. Output Impact of Wood Product Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
112	321 Wood Products	184,506	28,171	45	212,721
14	113 Forestry & Logging	0	53,965	13	53,978
495	92 Government & non NAICS	0	2,696	7,114	9,810
394	484 Truck transportation	0	6,778	456	7,234
18	115 Ag & Forestry Services	0	5,152	29	5,180
482	811 Repair & maintenance	0	2,451	907	3,358
30	221 Utilities	0	2,303	907	3,210
430	521 Monetary authorities	0	1,284	1,234	2,518
481	722 Food service & drinking places	0	501	1,914	2,415
437	541 Professional- scientific & tech service	0	1,582	555	2,137
	Total	$184,506	$112,862	$25,665	$323,034

Table 18. Employment Impact of Wood Product Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
112	321 Wood Products	1.1	0.2	0	1.2
14	113 Forestry & Logging	0	0.2	0	0.2
18	115 Ag & Forestry Services	0	0.2	0	0.2
394	484 Truck transportation	0	0.1	0	0.1
481	722 Food service & drinking places	0	0	0.1	0.1
495	92 Government & non NAICS	0	0	0.1	0.1
1	111 Crop Farming	0	0	0	0
12	112 Livestock	0	0	0	0
16	114 Fishing- Hunting & Trapping	0	0	0	0
19	211 Oil & gas extraction	0	0	0	0
	Total	1.1	0.9	0.4	2.4

Table 19. Output Impact of Educational Programs Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
461	611 Educational service	67,404	116	100	67,619
495	92 Government & non NAICS	0	725	3,601	4,326
431	531 Real estate	0	2,111	302	2,414
33	230 Construction	0	1,623	98	1,721
437	541 Professional- scientific & tech service	0	1,059	281	1,340
481	722 Food service & drinking places	0	103	969	1,072
482	811 Repair & maintenance	0	358	459	817
464	621 Ambulatory health care	0	11	800	812
430	521 Monetary authorities	0	186	625	811
30	221 Utilities	0	345	459	805
	Total	$67,404	$10,541	$12,990	$90,936

Table 20. Employment Impact of Educational Programs Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
461	611 Educational service	1.7	0	0	1.8
1	111 Crop Farming	0	0	0	0
12	112 Livestock	0	0	0	0
14	113 Forestry & Logging	0	0	0	0
16	114 Fishing- Hunting & Trapping	0	0	0	0
18	115 Ag & Forestry service	0	0	0	0
19	211 Oil & gas extraction	0	0	0	0
20	212 Mining	0	0	0	0
27	213 Mining services	0	0	0	0
30	221 Utilities	0	0	0	0
	Total	1.7	0.1	0.2	2.1

While the Agriculture and Forestry Services sector generally focuses more on services for agricultural production, forest fuel reduction and forest stand monitoring activities are also included in this category (Tables 21 and 22). In 2005, Wallowa Resources spent $62,828 which had a total output impact of $94,602, or an output multiplier of 1.35. As expected, crop farming and livestock farming had the greatest indirect economic impacts. These

programs directly generated 2.4 jobs, largely complementing or supplementing activities within the traditional purview of the USFS.

Table 21. Output Impact of Forestry Support Programs Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
18	115 Ag & Forestry service	62,828	267	24	63,119
495	92 Government & non NAICS	0	186	6,055	6,241
1	111 Crop Farming	0	2,790	279	3,069
12	112 Livestock	0	2,487	56	2,543
437	541 Professional- scientific & tech service	0	1,393	472	1,865
481	722 Food service & drinking places	0	14	1,629	1,643
464	621 Ambulatory health care	0	0	1,346	1,346
430	521 Monetary authorities	0	260	1,051	1,310
401	441 Motor vehicle& parts dealers	0	22	1,057	1,079
30	221 Utilities	0	218	772	991
	Total	$62,828	$9,931	$21,843	$94,602

Table 22. Employment Impact of Forestry Support Programs Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
18	115 Ag & Forestry service	2.4	0	0	2.4
481	722 Food service & drinking places	0	0	0.1	0.1
495	92 Government & non NAICS	0	0	0.1	0.1
1	111 Crop Farming	0	0	0	0
12	112 Livestock	0	0	0	0
14	113 Forestry & Logging	0	0	0	0
16	114 Fishing- Hunting & Trapping	0	0	0	0
19	211 Oil & gas extraction	0	0	0	0
20	212 Mining	0	0	0	0
27	213 Mining services	0	0	0	0
	Total	2.4	0.1	0.4	2.9

Finally, logging programs accounts for only one of WR's programmatic activities; timber pole cutting. The programs of Wallowa Resources focus more heavily on restoration and stewardship than harvesting timber. As a result, only a small expenditure occurred in this category in 2005. While the actual expenditure in the Logging and Forestry category was small ($7,971), it had a total output impact of $14,999, almost twice the amount actually spent (an estimated 1.88 output multiplier) (Table 23). The employment impacts were not as great, as only 0.1 jobs were generated or supported by these programs.

Although input/output modeling provides a quantitative analysis of the economic impacts of programs, it does not completely capture the value of an organization. Wallowa Resources helps to manage forest land that may otherwise be unproductive economically, create greater fire risk, or potentially, be converted industrial or residential uses. Protection, managed use and restoration of this forest land may have a greater value to local residents than that reflected by the input/output model. The impacts of this organization are not limited to the number of jobs created or the total output impact. Wallowa Resources provides job training, environmental education, and community interaction, among other invaluable benefits. These cannot be captured in the model, but are valuable nonetheless.

Table 23. Output Impact of Logging Programs Expenditures

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
14	113 Forestry & Logging	7,971	3,749	1	11,721
18	115 Ag & Forestry service	0	1,118	2	1,120
495	92 Government & non NAICS	0	36	407	443
482	811 Repair & maintenance	0	118	52	169
1	111 Crop Farming	0	139	19	158
430	521 Monetary authorities	0	56	71	127
481	722 Food service & drinking places	0	1	110	111
30	221 Utilities	0	42	52	94
464	621 Ambulatory health care	0	0	91	91
12	112 Livestock	0	84	4	88
	Total	$7,971	$5,559	$1,469	$14,999

Local impacts of community forestry: Public Lands Partnership, Delta and Montrose Counties Colorado

The economy of Delta and Montrose Counties, Colorado

Delta and Montrose Counties occupies over two million acres on the Western Slope of Colorado. The area has a total population of 61,266, with 27,834 residents living in Delta County and 33,432 residents living in Montrose County. The population of the area is growing more slowly than the state of Colorado, but is exceeding the growth rate of the United States. Similar to Wallowa County, 80% of the area's population holds a high school degree while 13% have earned a college degree or higher. While Delta is commonly considered a farming and ranching community, 11% of the population is employed in the manufacturing sector in Montrose County.

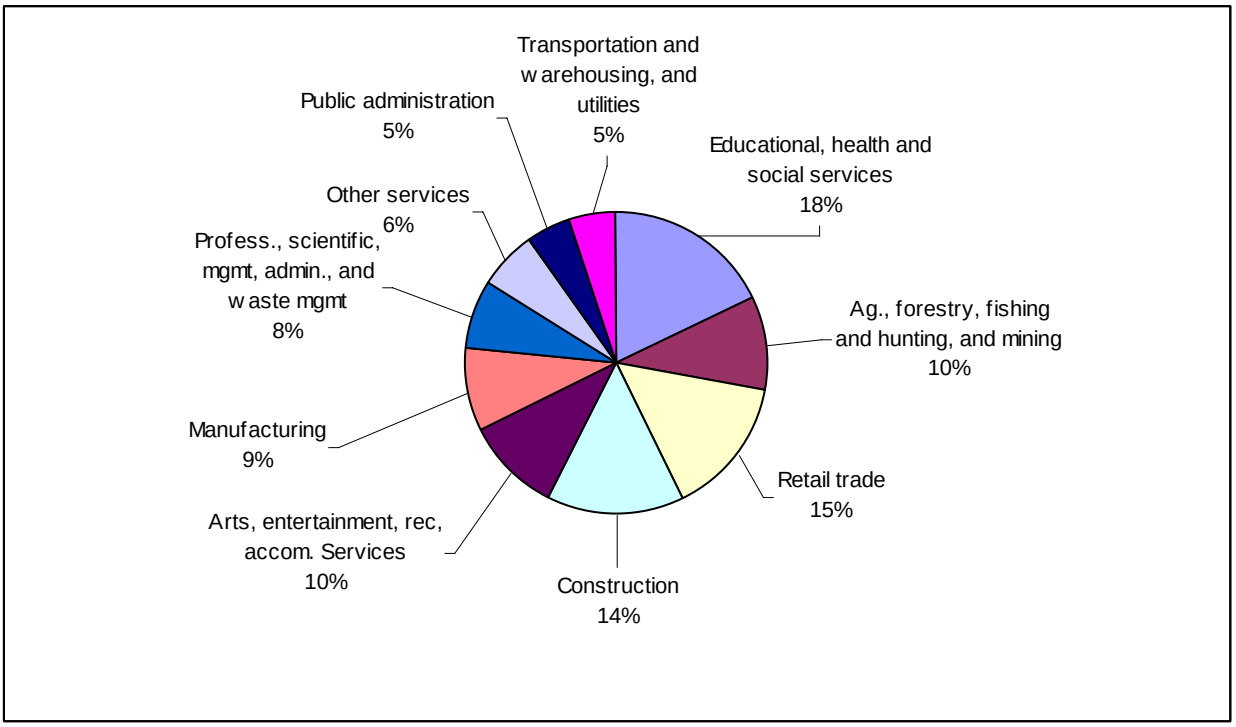
Unlike many rural areas, the employment and income profile of Delta and Montrose Counties illustrates that the local economy is relatively diverse, with the Educational, Health, and Social Services sector, employing the greatest share (18%) of the workforce followed by Retail Trade, and Construction (Figure 2). The Agricultural, Forestry, Fishing, Hunting and Mining sector is the fourth largest employer in the area (10%, 2,443 jobs) (US Bureau of Labor, 2006).

Similar to Wallowa, Delta and Montrose Counties experience high employment seasonality. This is consistent with the profile of a typical agricultural community. Historically, this region suffers from both high employment seasonality as well as high unemployment relative to the state of Colorado and the nation as a whole. According to the U.S. Bureau of Economic Analysis data, a significant portion of the population was living under the poverty line. Of the residents 18 years and younger, 15% lived below the poverty line in Delta County and 18% in Montrose County (EPSc, 2003). Average household income is increasing and rose by 31.7% in Delta County and 16.0% in Montrose County from 1989 to 1999 (EPS, 2003). In 1999, average household income in Delta County was $32,785 and $35,234 in Montrose County as compared to the national average of $31,472 (EPS, 2003).

To further understand the role of Public Lands Partnership (PLP), IMPLAN was used to create an input/output model. This will help to track the organizations impacts throughout the economy.

Table 24 provides an overview of the aggregated economy of Delta and Montrose Counties as generated using IMPLAN. For the area, total direct industry output is over $1,328 million dollars, based on 2002 data. The Government sector is the largest sector, generating over 15% of the total direct industry output, in 2002. The Agriculture, Forestry, Fishing and Hunting sectors generate the second highest industry output, over $331 million dollars (about 14% of the total economy), 3,770 jobs and almost $33 million in employee wages and salaries.

Figure 2. Delta and Montrose County Employment by Sector, 2003



Source: Economic Profile System, 2006

A Type II output multiplier, accounting for direct, indirect and induced effects of production processes on the local economy, was calculated, analogous to our analysis of Wallowa County. Including a Type II multiplier of 1.56, the indirect and induced effects of $1,329 million in economic output is approximately $2,442 million and the total size of the economy is approximately $3,770 million.

This project focuses on the effects of community based forestry on local economies. To better understand these effects, a focused view of the forestry and logging sectors is provided. In 2002, the Logging sector employed 131 residents and generated a total output of $18.817 million. Proprietors earned $1.668 million from this sector. The Agriculture and Forestry Support Activities sector generated 579 jobs and a total output of $11.612 million, in 2002. It is interesting to note that the Forest Nurseries, Forest Products and Timber sectors do not report any information. This is due to the small number (three or fewer) of operations within these industries, locally, which causes confidentiality and disclosure issues.

Table 24. Total Output Summary for Delta and Montrose Counties, Colorado, 2002 (IMPLAN)

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Ag, Forestry, Fish & Hunting	331.672	3,770	32.976	12.287	48.764	9.19	103.216
Mining	76.739	403	16.867	9.345	14.272	4.736	45.22
Utilities	68.75	254	14.83	0.651	23.633	7.453	46.567
Construction	293.391	2,593	62.656	52.163	11.142	1.506	127.469
Manufacturing	319.03	2,009	58.228	2.428	35.534	2.202	98.391
Wholesale Trade	59.503	694	21.45	1.994	9.533	10.103	43.08
Transportation & Warehousing	53.501	703	18.761	-1.774	2.703	1.738	21.428
Retail trade	196.035	3,804	76.929	11.899	29.447	28.887	147.162
Information	44.077	321	9.084	2.746	7.419	1.793	21.042
Finance & insurance	84.29	690	22.866	2.198	25.072	1.417	51.552
Real estate & rental	92.774	826	9.704	8.567	31.472	7.722	57.464
Professional-scientific & tech services	63.783	935	27.402	13.657	4.748	0.797	46.603
Management of companies	6.952	33	3.412	0.015	1.484	0.079	4.991
Administrative & waste services	33.348	814	14.386	2.552	2.777	0.634	20.35
Educational service	1.149	27	0.432	0.105	0.093	0.021	0.651
Health & social services	134.756	2,700	57.567	13.087	10.27	1.099	82.022
Arts- entertainment & recreation	10.974	197	4.449	0.838	0.376	0.521	6.184
Accommodation & food services	74.112	2,032	22.811	2.063	4.279	2.816	31.969
Other services	88.19	1,580	34.944	10.874	1.09	1.409	48.318
Government & non NAICS	367.493	4,157	193.334	0	115.232	16.621	325.187
Totals	2,400.519	28,542	703.088	145.693	379.340	100.745	1328.866

*Millions of dollars

Table 25. Total Output Summary for Forestry and Related Sectors in Delta and Montrose Counties, Colorado (IMPLAN) 2002

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Logging	18.817	131	0.517	1.668	1.731	0.111	4.028
Forest nurseries, forest products, timber	0	0	0	0	0	0	0
Ag. and forestry support activities	11.612	579	5.529	3.492	-1.99	0.118	7.149

*millions of dollars

Tables 26 and 27 show total output and total employment impacts after adjusting for the multiplier effects. After adjusting for the Type II multiplier of 1.63 in the Logging sector and 1.64 in the Agriculture and Forestry Support sector, the total output impact is $49.749 million. After the two sectors are adjusted for additional employment impacts, the total employment impact is 949 jobs.

Table 26. Output Multipliers and Total Adjusted Output for Delta and Montrose Counties (IMPLAN)

Industry	Direct Effects	Indirect Effects	Induced Effects	Total	Type II Multiplier	Total Output Impact ($ millions)
Logging	1	0.517	0.113	1.631	1.631	30.682
Ag and forestry support activities	1	0.226	0.416	1.642	1.642	19.067

Table 27. Employment Multipliers and Total Adjusted Employment for Delta and Montrose Counties (IMPLAN)

Industry	Direct Effects	Indirect Effects	Induced Effects	Total	Type II Multiplier	Total Employment Impact
Logging	6.961	5.993	1.496	14.450	2.076	272
Ag and forestry support activities	49.896	2.935	5.490	58.321	1.169	677

A shift share analysis was also performed for this area to set the export base analysis in the proper context and give some basis for comparison. Table 28 provides the shift share analysis for Delta and Montrose Counties from 1990 to 2005. The state of Colorado and the United States are used as the benchmarks for comparison.

Table 28. Shift Share Analysis for Delta and Montrose Counties, 1990 – 2005

	National Growth		Industrial Mix		Competitive Share	
Sector	Percent	Jobs	Percent	Jobs	Percent	Jobs
Trade, Transportation and Utilities	20.9	440	-7.7	-162	27.6	582
Professional and Business Services	20.9	55	39.4	104	116.1	305
Manufacturing	20.9	80	-41.4	-159	74.4	286
Leisure and Hospitality	20.9	175	15.4	129	25.6	214
Construction	20.9	68	17.6	57	56.9	186
Other Services	20.9	34	3.7	6	69.4	114
Financial Activities	20.9	77	-3.2	-12	21.5	79
Education and Health Services	20.9	384	20.9	384	3.5	64
Public Administration	20.9	135	-8.7	-56	5.9	38
Information	20.9	30	-10.6	-15	7.9	11
Natural Resources and Mining	20.9	274	-22.4	-293	-7.2	-94
Total		1,752		-17		1,785

The nation grew at an average rate of 20.9% over the 11 principal industries during the period 1990-2005. If the area had experienced the same growth rates, Delta and Montrose Counties could expect an increase of 1,752 jobs over the time period (see National Growth in Table 28).

If each industry in the region had followed the national trend, 17 jobs would have been lost from 1990 – 2005. The largest industrial component was in the Professional and Business Services sector (39.4%). This is a concentrated industry within the region and, as a result, 104 new jobs would have been expected to be generated by this industry. The second largest industry is the Education and Health Services sector (20.9%). This industry is also concentrated in Delta and Montrose and would have generated 384 new jobs had the region followed this trend. The Natural Resources and Mining sector would have experienced a loss of 293 jobs had Delta and Montrose County followed the national trend.

According to the local share component, 1,785 of all jobs created in Delta and Montrose Counties are attributed to the county's relative competitive position. The region created a greater share of employment growth than the nation did, on average. This may indicate that the area effectively allocates resources among industries. The area is more competitive than the national average in each of the industries with the exception of Natural Resources and Mining. Delta and Montrose are highly competitive in the Professional and Business sector (116.1%), Manufacturing (74.4%) and the Other Services sector (69.4%). This region is just slightly more competitive than the national average in the Public Administration (5.9%) and the Education and Health Services sector (3.5%). Finally, the area falls short of the national average in Natural Resources and Mining with a competitive share of -7.2%.

A Location Quotient was calculated to determine in what industries the area is self-sufficient. Table 29 compares the state of Colorado, Delta County and Montrose County to the proportion of people employed in important sectors nationwide for 2001 and 2005.

Table 29. Location Quotient for Colorado and Delta County, 2001 and 2005

	State of Colorado		Delta County		Montrose County	
Industry	2001	2005	2001	2005	2001	2005
Base Industry: Total, all industries	1	1	1	1	1	1
Natural Resources and Mining	0.94	1.11	6.5	6.6	2.35	2.43
Construction	1.44	1.32	1.23	1.15	1.88	1.94
Manufacturing	0.65	0.64	0.58	0.7	0.98	1.05
Trade, Transportation, and Utilities	0.95	0.96	1.15	1.18	1.22	1.14
Information	1.74	1.52	0.57	0.71	0.57	0.68
Financial Activities	1.13	1.15	0.76	0.86	0.72	0.83
Professional and Business Services	1.1	1.12	0.65	0.54	0.47	0.56
Education and Health Services	0.78	0.81	1.02	0.88	0.85	0.82
Leisure and Hospitality	1.21	1.21	1.22	1.14	1.12	0.98
Other Services	0.92	0.9	0.67	0.77	0.93	0.84
Unclassified	0.05	0.06	0.08	NC	NC	NC
Forestry and Logging	0.13	ND	ND	ND	0.70	1.35
Logging	0.14	0.11	ND	ND	0.76	1.48
Ag. and Forestry Support Services	0.37	0.46	4.89	4.46	3.17	2.27

In 2005, Delta County exported from the Natural Resource and Mining sector and the Support Activities for Forestry sector (Table 29). Both counties and the state of Colorado have similar employment profiles to the nation in most sectors. While the state of Colorado experienced an increase in employment in the Agriculture and Forestry Support Services sector, Delta County experienced a decrease in employment in this sector. In 2005, Delta County had more than 9 times as many people as a proportion of the population employed in Agriculture and Forestry Support Services than Colorado and more than 4 times the national average.

In 2005, Montrose County exported goods from the Natural Resource and Mining, Construction, Forestry and Logging, Logging, and Ag. and Forestry Support Activities sectors. Similar to Delta County, Montrose County also experienced a decrease in employment in the Agriculture and Forestry Support Services sector. Although a decrease in employment occurred, Montrose had almost 5 times as many people as a proportion of the population employed in this sector than Colorado and over twice the national average.

The NC in the Unclassified sector and the ND in the Forestry and Logging and Logging sectors for both the state of Colorado both counties indicate that the LQ for this industry is non-calculable or data are not available due to disclosure issues.

Public Lands Partnership

Public Lands Partnership is a non-profit organization which began in 1992 on the Western Slope of Colorado. The organization began as loose group of residents, businesses, government agencies, and land management agencies

and has since evolved into an active facilitator among local groups as well as a driving force for environmental education. PLP prides itself on bringing people together and getting them to agree toward positive action when they would not otherwise do so. The organization is funded through grants from the Ford Foundation as well as Colorado's Department of Wildlife. With the aid of these grants, PLP is able to work with the local government to promote the ecologically and economically sustainable management of public lands on the Western Slope.

Public Lands Partnership has become involved in several projects to promote sustainable management of public lands as well as provide environmental education for the public. PLP is an active participant in several restoration projects, including the Uncompahgre Plateau Project where local agencies are working together to restore the wildlife habitat of this area. This will provide benefits to both wildlife and the local people. A second restoration project is the Rancher Habitat Program where local ranchers are encouraged to transition to more sustainable means of production. PLP also works towards educating the community through video documentary of the local history as well as a Logger Demonstration project to promote local forestry. Given the nature of these projects, it is again difficult to fully capture the economic impacts of PLP, but again input/output modeling will be used to provide an estimate.

A project by project break out of funds was not available for Public Lands Partnership, so instead yearly expenditures were used. PLP received the Ford Foundation grant in 2000 and expenditures are tracked through 2005. As with Wallowa Resources, the various expenditures of PLP have been classified using the North American Industry Classification System (NAICS). This is then entered into IMPLAN which allows for the impact to be traced throughout the community. Table 30 provides a description of the various activities, the assigned NAICS code, a brief description of the code, and the budgetary outlay for the years 2000-2005.

Table 30. Description of Public Lands Partnership Activities

2000-01 Memo Description	NAICS #	Description	Amount
Postage and Delivery	491	Postal Services	29.53
Banking Fees	522	Credit Intermediation and Related Activities	195.45
Insurance	525	Funds, Trusts and Other Financial Vehicles	1,472.25
Bookkeeping/Secretarial and Prof. Fees	541	Professional, Scientific and Technical Services	2,109.24
General Office Supplies, Programs and Events	561	Admin. and Support services	36,000.67
Salary and Wages	5001	Wages	63,224.85
TOTAL			$103,031.99

2001-02 Memo Description	NAICS #	Description	Amount
Lunches	445	Food and Beverage Stores	1,032.64
Postage and Delivery	491	Postal Services	813.77
Banking Fees	522	Credit Intermediation and Related Activities	125.41
Insurance	525	Funds, Trusts and Other Financial Vehicles	4,436.20
Bookkeeping/Secretarial and Prof. Fees	541	Professional, Scientific and Technical Services	6,527.59
General Office Supplies, Programs, Events, Permits and Dues	561	Admin. and Support Services	47,582.82
Salary and Wages	5001	Wages	57,633.55
TOTAL			$118,151.98

2002-03 Memo Description	NAICS #	Description	Amount
Lunches	445	Food and Beverage Stores	3,285.99
Postage and Delivery	491	Postal Services	1,359.91
Banking Fees	522	Credit Intermediation and Related Activities	81.77

Insurance and FICA	525	Funds, Trusts and Other Financial Vehicles	12,961.60
Bookkeeping/Secretarial, Prof. Fees, Volunteers	541	Professional, Scientific and Technical Services	21,482.13
General Office Supplies, Programs, Events, Permits and Dues	561	Admin. and Support Services	28,339.25
Salary and Wages	5001	Wages	74,039.75
TOTAL			$141,550.40

2003-04 Memo Description	NAICS #	Description	Amount
Lunches	445	Food and Beverage Stores	4,153.07
Postage and Delivery	491	Postal Services	1,088.46
Banking Fees	522	Credit Intermediation and Related Activities	67.09
Insurance and FICA	525	Funds, Trusts and Other Financial Vehicles	4,836.94
Bookkeeping/Secretarial, Prof. Fees, Volunteers, Per Diems	541	Professional, Scientific and Technical Services	29,686.22
General Office Supplies, Programs, Events, Permits and Dues	561	Admin. and Support Services	12,446.52
Salary and Wages	5001	Wages	59,960.00
TOTAL			$112,238.30

2004-05 Memo Description	NAICS #	Description	Amount
Lunches	445	Food and Beverage Stores	3,979.38
Postage and Delivery	491	Postal Services	1,077.83
Book Project	511	Publishing Industries	5,800.00
Banking Fees	522	Credit Intermediation and Related Activities	18.00
Insurance and FICA	525	Funds, Trusts and Other Financial Vehicles	5,788.66
Bookkeeping/Secretarial, Prof. Fees, Volunteers, Per Diems	541	Professional, Scientific and Technical Services	24,487.10
General Office Supplies, Programs, Events, Permits and Dues	561	Admin. and Support Services	11,073.99
Salary and Wages	5001	Wages	72,440.00
TOTAL			$124,664.96

Summary (2000-2005)

Memo Description	NAICS #	Description	Amount
Lunches	445	Food and Beverage Stores	12,451.08
Postage and Delivery	491	Postal Services	4,369.50
Book Project	511	Publishing Industries	5,800.00
Banking Fees	522	Credit Intermediation and Related Activities	487.72
Insurance and FICA	525	Funds, Trusts and Other Financial Vehicles	29,495.65
Bookkeeping/Secretarial, Prof. Fees, Volunteers, Per Diems	541	Professional, Scientific and Technical Services	84,292.28
General Office Supplies, Programs, Events, Permits & Dues	561	Admin. and Support Services	135,443.25
Salary and Wages	5001	Wages	327,298.15
TOTAL			$599,637.63

IMPLAN accepts industrial classifications at the three digit NAICS code scale so the classifications used are quite broad. Tables 31 and 32 show the output impacts and employment impacts of PLP expenditures for the fiscal year 2000-2001. The top twenty industries are reported for each year. After the first year of funding from the Ford

Foundation (2000-2001), PLP expenditures totaled $102,837. After accounting for indirect and induced effects, PLP had a total output impact of $145,274, or less than 1/10 of a percent of the total regional economy. This figure may seem deceptively small. Stated differently, for every dollar PLP added to the economy, an additional 41 cents of economic activity was generated in Delta and Montrose counties. Given the nature of the organization's activities it is sensible that PLP would have a large impact on the Administrative Support sector, but the organization also had a significant impact on the Domestic Trade as well as the Professional, Scientific, and Technical Services sectors. Table 32 illustrates that 1.1 jobs were directly generated by PLP expenditures while an additional 0.6 jobs were created due to indirect and induced effects for the fiscal year.

After the second fiscal year (2001-2002), PLP spent $118,027 in the local economy which then generated an additional $54,304 within the counties. The total output impact was $172,331 or less than 1/10 of a percent of the total regional economy. For every one dollar spent in the local economy by PLP, an additional 46 cents are generated in the economy. As in the previous year, PLP had the greatest impact on the Administrative Support sector and the Professional, Scientific, and Technical Services sectors. In the 2001-2002 fiscal year, PLP directly generated 1.4 jobs while the organization had a total employment impact of 2.2 jobs (Tables 33 and 34).

After the third fiscal year (2002-2003), PLP expenditures totaled $132,201 with a total output impact of $187,579, which, although certainly not inconsequential, again accounted for less then 1/10 of a percent of the regional economy. PLP had the greatest impact on the Administrative Support Services and Professional, Scientific, and Technical Services sectors. From 2002-2003, every dollar spent by PLP generated an additional 42 cents. PLP had a total employment impact of 2.1 jobs. The organization directly generated 1.3 jobs and indirectly created 0.7 jobs, that same year (Tables 35 and 36).

Table 31. Output Impact of PLP Expenditures (2000-2001)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	41,479	4,936	4,632	51,047
28001	Domestic Trade	19,298	0	0	19,298
437	541 Professional- scientific & tech service	7,039	3,555	4,600	15,194
11001	Federal Government Non Defense	12,587	0	0	12,587
461	611 Educational service	4,421	1,744	3,695	9,861
495	92 Government & non NAICS	1,564	1,601	1,607	4,771
487	812 Personal & laundry service	2,354	17	1,668	4,040
46	311 Food products	1,104	1,164	1,145	3,413
12001	State/Local Govt Non Education	2,654	0	0	2,654
491	813 Religious- grantmaking- & similar	1,446	25	1,069	2,540
451	551 Management of companies	981	79	722	1,783
429	525 Funds- trusts & other finance	1,475	130	32	1,636
469	624 Social assistance	18	1,216	340	1,575
460	562 Waste mgmt & remediation service	0	1,337	133	1,471
432	532 Rental & leasing service	385	538	442	1,365
25001	Foreign Trade	1,247	0	0	1,247
482	811 Repair & maintenance	218	402	286	907
512	Other State and Local Govt Enterprise	382	172	325	879
471	711 Performing arts & spectator sports	56	548	212	816
124	322 Paper Manufacturing	399	80	315	794
	Total	102,837	19,399	23,038	145,274

Table 32. Employment Impact of PLP Expenditures (2000-2001)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	0.8	0.1	0.1	0.9
437	541 Professional- scientific & tech service	0.1	0	0.1	0.2
487	812 Personal & laundry service	0	0	0	0.1
491	813 Religious- grantmaking- & similar	0	0	0	0.1
495	92 Government & non NAICs	0	0	0	0.1
1	111 Crop Farming	0	0	0	0
12	112 Livestock	0	0	0	0
14	113 Forestry & Logging	0	0	0	0
16	114 Fishing- Hunting & Trapping	0	0	0	0
18	115 Ag & Forestry service	0	0	0	0
19	211 Oil & gas extraction	0	0	0	0
20	212 Mining	0	0	0	0
27	213 Mining services	0	0	0	0
30	221 Utilities	0	0	0	0
33	230 Construction	0	0	0	0
46	311 Food products	0	0	0	0
85	312 Beverage & Tobacco	0	0	0	0
92	313 Textile Mills	0	0	0	0
99	314 Textile Products	0	0	0	0
104	315 Apparel Mfg	0	0	0	0
	Total	1.1	0.3	0.3	1.7

Table 33. Output Impact of PLP Expenditures (2001-2002)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	52,577	6,202	5,954	64,733
437	541 Professional- scientific & tech service	11,021	4,778	5,913	21,712
28001	Domestic Trade	17,591	0	0	17,591
11001	Federal Government NonDefense	11,473	0	0	11,473
461	611 Educational service	4,030	2,099	4,750	10,879
495	92 Government & non NAICS	1,426	1,987	2,066	5,478
429	525 Funds- trusts & other finance	4,438	200	41	4,679
487	812 Personal & laundry service	2,146	18	2,145	4,309
46	311 Food products	1,007	1,414	1,472	3,892
491	813 Religious- grantmaking- & similar	1,318	23	1,375	2,715
12001	State/Local Govt NonEducation	2,419	0	0	2,419
469	624 Social assistance	17	1,554	438	2,009
451	551 Management of companies	894	93	929	1,916
460	562 Waste mgmt & remediation service	0	1,693	172	1,865
432	532 Rental & leasing service	351	709	568	1,628
513	U.S. Postal Service	857	345	146	1,347
25001	Foreign Trade	1,136	0	0	1,136
482	811 Repair & maintenance	199	509	368	1,077
405	445 food & beverage stores	1,033	18	1	1,052
471	711 Performing arts & spectator sports	51	722	273	1,046
	Total	118,027	24,689	29,615	172,331

Table 34. Employment Impact of PLP Expenditures (2001-2002)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	1	0.1	0.1	1.2
437	541 Professional- scientific & tech service	0.1	0.1	0.1	0.3
429	525 Funds- trusts & other finan	0.1	0	0	0.1
487	812 Personal & laundry service	0	0	0	0.1
491	813 Religious- grantmaking- & similar	0	0	0	0.1
495	92 Government & non NAICS	0	0	0	0.1
1	111 Crop Farming	0	0	0	0
12	112 Livestock	0	0	0	0
14	113 Forestry & Logging	0	0	0	0
16	114 Fishing- Hunting & Trapping	0	0	0	0
18	115 Ag & Forestry service	0	0	0	0
19	211 Oil & gas extraction	0	0	0	0
20	212 Mining	0	0	0	0
27	213 Mining services	0	0	0	0
30	221 Utilities	0	0	0	0
33	230 Construction	0	0	0	0
46	311 Food products	0	0	0	0
85	312 Beverage & Tobacco	0	0	0	0
92	313 Textile Mills	0	0	0	0
99	314 Textile Products	0	0	0	0
	Total	1.4	0.4	0.4	2.2

Table 35. Output Impact of PLP Expenditures (2002-2003)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	33,987	4,790	6,234	45,011
437	541 Professional- scientific & tech service	27,255	5,641	6,191	39,087
28001	Domestic Trade	22,599	0	0	22,599
11001	Federal Government NonDefense	14,740	0	0	14,740
461	611 Educational service	5,177	2,117	4,974	12,269
495	92 Government & non NAICS	1,831	2,131	2,163	6,125
487	812 Personal & laundry service	2,757	21	2,245	5,024
429	525 Funds- trusts & other finance	4,464	202	43	4,709
46	311 Food products	1,293	1,382	1,541	4,216
405	445 food & beverage stores	3,287	55	1	3,342
491	813 Religious- grantmaking- & similar	1,693	29	1,439	3,161
12001	State/Local Govt NonEducation	3,108	0	0	3,108
451	551 Management of companies	1,149	102	972	2,223
469	624 Social assistance	21	1,577	458	2,057
513	U.S. Postal Service	1,415	332	152	1,899
432	532 Rental & leasing service	451	732	594	1,778
25001	Foreign Trade	1,460	0	0	1,460
460	562 Waste mgmt & remediation service	0	1,117	180	1,297
482	811 Repair & maintenance	256	654	385	1,295
512	Other State and Local Govt Enterprise	448	275	437	1,160
	Total	132,201	24,370	31,008	187,579

Table 36. Employment Impact of PLP Expenditures (2002-2003)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	0.6	0.1	0.1	0.8
437	541 Professional- scientific & tech service	0.3	0.1	0.1	0.5
429	525 Funds- trusts & other finance	0.1	0	0	0.1
461	611 Educational service	0	0	0	0.1
487	812 Personal & laundry service	0	0	0	0.1
491	813 Religious- grantmaking- & similar	0	0	0	0.1
495	92 Government & non NAICS	0	0	0	0.1
1	111 Crop Farming	0	0	0	0
12	112 Livestock	0	0	0	0
14	113 Forestry & Logging	0	0	0	0
16	114 Fishing- Hunting & Trapping	0	0	0	0
18	115 Ag & Forestry service	0	0	0	0
19	211 Oil & gas extraction	0	0	0	0
20	212 Mining	0	0	0	0
27	213 Mining services	0	0	0	0
30	221 Utilities	0	0	0	0
33	230 Construction	0	0	0	0
46	311 Food products	0	0	0	0
85	312 Beverage & Tobacco	0	0	0	0
92	313 Textile Mills	0	0	0	0
	Total	1.3	0.3	0.4	2.1

In the fourth fiscal year (2003-2004), PLP expenditures decreased significantly from $132,201 the previous year to $112,171. As opposed to the previous years, the money spent by PLP had the greatest effect on the Professional, Scientific, and Technical Services sector. On a per dollar basis, this did not have an effect on the total output impacts for the year. Although PLP accounted for less than 1/10 of a percent of the total regional economy, for every dollar spent by PLP in the economy, an additional 42 cents were generated. The result was similar for total employment impacts. In 2004, 1 job was directly created while an additional 0.7 jobs were created by indirect and induced effects (Table 37; 38).

In the final year of the analysis (2004-2005), PLP spent a total of $124,647 in the local economy. This money generated an additional 40 cents for every dollar spent within the economy for a total output impact of $174,198, accounting for less than 1/10 of a percent of the regional economy. Again, the Professional, Scientific, and Technical Services sector shows the greatest impact from the expenditures. In 2005, PLP directly generated 1.1 jobs within the local economy and had a total employment impact of 1.8 jobs (Table 39; 40).

As with Wallowa Resources, it is difficult to capture the total economic impact of Public Lands Partnership on the local economies of Delta and Montrose Counties. Each year, PLP output impacts accounted for less than 1/10 of a percent of the total economy. However, the yearly impact of the organization reached between $150 and $200 thousand each year, a significant injection in any economy. This fact highlights the efficacy of our approach over more typical regional analyses. By working from the project upward we can identify $175 thousand dollars worth of economic activity attributable to the organization annually. Had we viewed the economy from the top down and searched for the influence of the organization in the overall economy, we probably would not have found it. Moreover, PLP works with local residents and agencies to better manage public lands on the Western Slope of Colorado. This will have impacts that extend beyond the scope of the input/output model. The value of the working relationships formed and the educational aspects of projects carried out by PLP cannot be fully captured by this type of approach, yet are nonetheless invaluable to the region.

Table 37. Output Impact of PLP Expenditures (2003-2004)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
437	541 Professional- scientific & tech service	34,361	5,315	5,315	44,991
452	561 Admin support service	17,642	3,148	5,352	26,141
28001	Domestic Trade	18,302	0	0	18,302
11001	Federal Government NonDefense	11,937	0	0	11,937
461	611 Educational service	4,193	1,717	4,270	10,179
495	92 Government & non NAICs	1,483	1,825	1,856	5,164
429	525 Funds- trusts & other finan	4,839	185	37	5,061
405	445 food & beverage stores	4,154	69	1	4,223
487	812 Personal & laundry service	2,233	18	1,927	4,178
46	311 Food products	1,047	1,106	1,323	3,476
491	813 Religious- grantmaking- & similar	1,371	24	1,235	2,630
12001	State/Local Govt NonEducation	2,517	0	0	2,517
451	551 Management of companies	930	87	835	1,851
469	624 Social assistance	17	1,336	393	1,747
513	U.S. Postal Service	1,133	265	131	1,529
432	532 Rental & leasing service	365	610	510	1,486
25001	Foreign Trade	1,182	0	0	1,182
482	811 Repair & maintenance	207	641	331	1,179
471	711 Performing arts & spectator sports	53	696	245	994
512	Other State and Local Govt Enterprise	362	256	376	994
	Total	112,171	20,109	26,618	158,897

Table 38. Employment Impact of PLP Expenditures (2003-2004)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
437	541 Professional- scientific & tech service	0.4	0.1	0.1	0.5
452	561 Admin support service	0.3	0.1	0.1	0.5
429	525 Funds- trusts & other finan	0.1	0	0	0.1
487	812 Personal & laundry service	0	0	0	0.1
491	813 Religious- grantmaking- & similar	0	0	0	0.1
495	92 Government & non NAICs	0	0	0	0.1
1	111 Crop Farming	0	0	0	0
12	112 Livestock	0	0	0	0
14	113 Forestry & Logging	0	0	0	0
16	114 Fishing- Hunting & Trapping	0	0	0	0
18	115 Ag & Forestry service	0	0	0	0
19	211 Oil & gas extraction	0	0	0	0
20	212 Mining	0	0	0	0
27	213 Mining services	0	0	0	0
30	221 Utilities	0	0	0	0
33	230 Construction	0	0	0	0
46	311 Food products	0	0	0	0
85	312 Beverage & Tobacco	0	0	0	0
92	313 Textile Mills	0	0	0	0
99	314 Textile Products	0	0	0	0
	Total	1	0.3	0.4	1.7

Table 39. Output Impact of PLP Expenditures (2004-2005)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
437	541 Professional- scientific & tech service	30,135	5,949	5,511	41,595
452	561 Admin support service	17,351	3,318	5,549	26,218
28001	Domestic Trade	22,111	0	0	22,111
11001	Federal Government NonDefense	14,421	0	0	14,421
461	611 Educational service	5,066	1,869	4,427	11,362
429	525 Funds- trusts & other finance	5,791	205	38	6,034
495	92 Government & non NAICS	1,792	2,113	1,925	5,830
413	511 Publishing industries	5,801	7	1	5,809
487	812 Personal & laundry service	2,698	21	1,999	4,717
405	445 food & beverage stores	3,980	98	1	4,078
46	311 Food products	1,265	1,174	1,371	3,810
12001	State/Local Govt NonEducation	3,041	0	0	3,041
491	813 Religious- grantmaking- & similar	1,656	28	1,281	2,966
451	551 Management of companies	1,124	96	865	2,085
469	624 Social assistance	21	1,417	408	1,845
432	532 Rental & leasing service	441	718	529	1,689
513	U.S. Postal Service	1,132	280	136	1,547
25001	Foreign Trade	1,428	0	0	1,428
482	811 Repair & maintenance	250	632	343	1,226
512	Other State and Local Govt Enterprise	438	286	389	1,113
	Total	124,647	21,952	27,599	174,198

Table 40. Employment Impact of PLP Expenditures (2004-2005)

Sector Number	Industry Sector	Direct	Indirect	Induced	Total
437	541 Professional- scientific & tech service	0.3	0.1	0.1	0.5
452	561 Admin support service	0.3	0.1	0.1	0.5
413	511 Publishing industries	0.1	0	0	0.1
429	525 Funds- trusts & other finance	0.1	0	0	0.1
461	611 Educational service	0	0	0	0.1
487	812 Personal & laundry service	0	0	0	0.1
491	813 Religious- grantmaking- & similar	0	0	0	0.1
495	92 Government & non NAICS	0	0	0	0.1
1	111 Crop Farming	0	0	0	0
12	112 Livestock	0	0	0	0
14	113 Forestry & Logging	0	0	0	0
16	114 Fishing- Hunting & Trapping	0	0	0	0
18	115 Ag & Forestry service	0	0	0	0
19	211 Oil & gas extraction	0	0	0	0
20	212 Mining	0	0	0	0
27	213 Mining services	0	0	0	0
30	221 Utilities	0	0	0	0
33	230 Construction	0	0	0	0
46	311 Food products	0	0	0	0
85	312 Beverage & Tobacco	0	0	0	0
	Total	1.1	0.3	0.4	1.8

Contrasting the Roles of CBF Organizations

Wallowa Resources and Public Lands Partnership are two very different community based forestry organizations. Wallowa Resources focuses on restorative and educational programs for the community as well as aids in developing value added forest products. WR takes a very direct, hands on approach to community forestry. This can easily be seen in the analysis by examining the types of sectors which are most greatly impacted by WR. Similar to PLP, Wallowa Resources has a large impact on the Administrative Support Services sector, but the organization also impacts the Wood Products, Educational Services, and Agriculture and Forestry Support Services sectors.

Public Lands Partnership also takes a very active role in the community, but instead of creating several different programs, PLP focuses on forming relationships within the community and coordinating the various groups within the community. These relationships form the foundation for several of the environmental education programs within the region. PLP acts as a facilitator and between groups that may not otherwise have access to lines of communication. Beyond the role of facilitator, PLP also serves a both a form leadership and coordination within the region. In our analysis, Wallowa Resources directly impacted the Wood Products and Agriculture and Forestry sectors, while PLP has the greatest impacts on the Administrative Support Services and Professional, Scientific, and Technical Services sectors.

It must be noted that we are not suggesting that either organization is better than the other. This is simply an example of the different roles a community based forestry organization can take within a community. The role of the organization should be determined by the needs of the community. If the community is quite isolated, as in the case of Wallowa County, the organization may need to take a more direct approach to programming. Whereas, in the case of Delta and Montrose Counties, if the community is struggling to meet the needs of its residents and local government agencies, the CBF organization may need to take on the role of facilitator and coordinator.

Concluding remarks

Meaningful quantitative analysis of the role of community-based forestry remains challenged by the high degree of variation of organizations under the CBF umbrella. CBF organizations may vary substantially in scale, focus, role, longevity, expertise, local support networks, funding as well as success and measures of that success.

Reasonable people can disagree about what is and is not a CBF organization. It is difficult to reveal the drivers of successful CBFs when there is not agreement as to whether an equally weighted “three legged stool” or “triple bottom line” (ecology, economy and equity) is the standard, or if something less balanced could be equally desirable. The objectives of a CBF organization may not be clear or readily quantifiable at the scale of the data that are available to us. Many CBF organizations will engage in enabling, facilitative, convening or leveraging activities, which ultimately result in the achievement of community goals. Although these are directly or indirectly economic activities, in many cases, the extent to which any individual organization should be credited for such collaborations is again a matter about which reasonable people may disagree.

The intended outcomes of Community Based Forestry may be largely agreed upon by communities who choose to pursue this alternative for economic development. However, the chosen means to the commonly envisaged end vary substantially. Analytically, CBF is not simply an alternative means of producing the same forest products produced by industrial forestry. Rather, it is a distinctly different collection of ways to manage forest lands. These distinct approaches to land management imply different values and objectives of the managers. Such potentially strong philosophical differences in how the land is viewed may render an economic comparison between industrial style forestry, CBF, and the “no management” option a moot point. However, to approach the management of private and public forestlands through the lens of a SBCA does help to highlight the likely differences and tradeoffs evident in adopting one approach over another. We hope that this approach will help communities facing similar choices to make better informed decisions appropriate to their needs and aspirations.

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