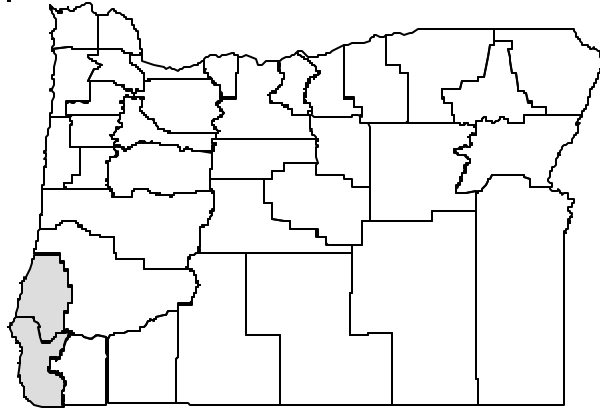


# A Community-Based Assessment of the Developing Ecosystem Management Industry in Coos and Curry Counties, Oregon



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Naida Hedgepeth, Labor Economic Action Project  
Charles Spencer, University of Oregon

In Cooperation with Organization for Economic Initiatives, Inc.  
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## Ecosystem Workforce Study

### Advisory Board:

Stephanie Carey  
Environmental Tech/Forestry Program,  
Southwestern Oregon Community College  
Coos Bay

Jim Clarke  
Weyerhaeuser  
Coos Bay

Anne Donnelly  
Coos Watershed Assoc.  
Coos Bay

Ralph Duddles  
Forestry Extension Agent,  
OSU Extension Service  
Coquille

Rick Evans  
Oregon Economic Initiatives, Inc.  
Coos Bay

Derek Godwin  
Watershed Extension Agent  
OSU Extension Service  
Gold Beach

Jennifer Hampel  
Coquille Watershed Assoc.  
Coquille

Deborah Houshour  
Houshour, Inc.  
Myrtle Point

Don Porier  
Bureau of Land Management, Coos Bay  
District  
North Bend

Mike Rose  
Woodworkers Union Local 246  
Coos Bay

Paul Slater  
Coquille Watershed Association  
Coquille

Beverly Thacker  
Oregon Economic Development Dept.  
Salem

Max Yeager  
Fish Biologist,  
USDA Forest Service  
Powers

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Labor Economic Action Project Contact:  
Naida Hedgepeth Phone/ Fax: 541-888-3282; email: leapp@hotmail.com

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## 1. Why a workforce assessment? ...Survey Objectives

**Finding our way in a rapidly changing resource management arena:** Timber communities in the Pacific Northwest continue to be challenged by the changing economy and the need to find avenues to healthy, sustainable landscapes with healthy rural communities. Tremendous job losses in the timber industry has left rural families and communities faced with staggering adjustments. And the economic diversification that has buoyed the Oregon economy has by and large missed the rural timber communities.

Watershed councils, resource managers and community economic development practitioners have a stake, then, in exploring ways to link needed watershed restoration and on going stewardship with social and economic objectives. The vision motivating the federal Jobs in the Woods program, in fact captures a broad agenda that cuts across public and private institutional and land ownership lines, well beyond any single program: How can we link stewardship of the watershed with good jobs supporting strong families and healthy communities? To make progress communities will need a way to determine the state of the changing industries associated with the natural resource base. Communities need *local* information for *local* participation in shaping the *local* economy. Practitioners in the communities need methodologies that can help demystify “supply and demand,” and make choices that will benefit the land *and* their grandchildren.

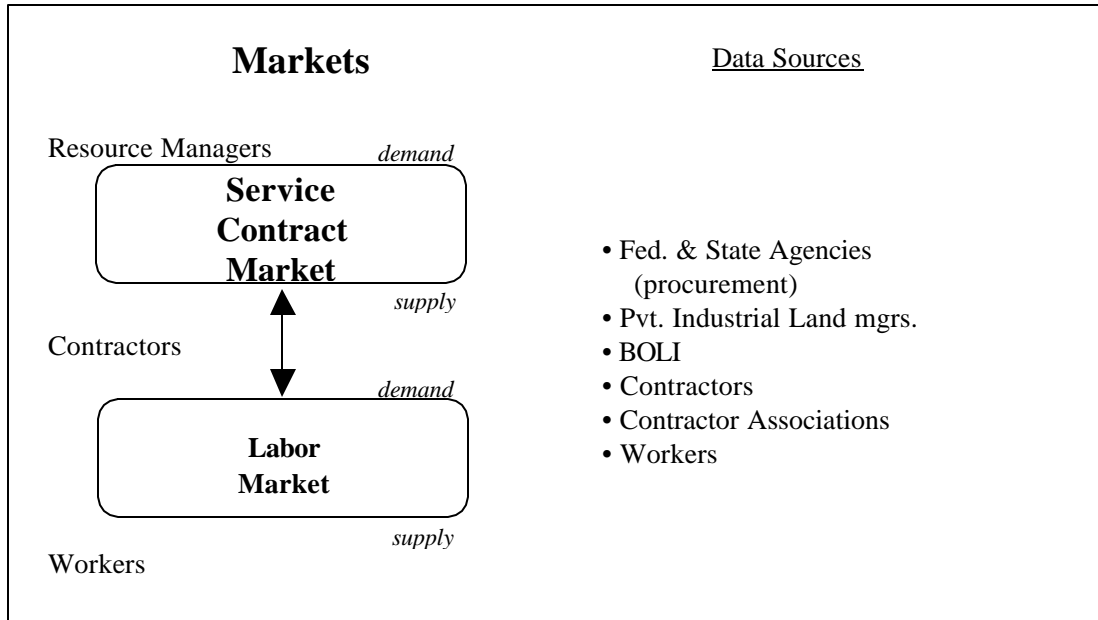
The precedent setting “Oregon Plan” to restore watersheds and salmon runs provides a rich opportunity for rural communities to learn how to make these connections “on the ground.” Many watershed councils have already begun to do so. The Coos and Coquille Watershed Associations include social and economic health as part of their mission.

The Labor Economic Action Project (LEAP) saw a local industry assessment project as a concrete way to help the watershed councils in the area while raising awareness of the opportunities and challenges for workers, contractors and resource managers. LEAP was formed in 1995 to bring labor and community advocates together to advocate for economic development strategies that focus on quality jobs for the long term. LEAP approached Oregon Economic Initiative, Inc. and Oregon Economic Development Department for assistance in mobilizing resources to conduct a survey of land managers, contractors and workers. *The objective was to provide watershed councils, resource managers and community economic development practitioners in the Coos and Coquille watersheds with a snapshot of the current state of the developing ecosystem management industry, while building and/or strengthening local relationships needed to monitor social and economic parameters of forest and watershed assessment, treatment and monitoring.*

To do this LEAP knew it had to gather solid information on the quantity and type of demand driving local employment. To do this assessment [planners needed a basic roadmap of the market so as to know where to look. The initial work of the assessment project determined that the markets driving resource management employment results is a three-part system. Land managers determine work needed on the land base, contractors are secured to provide those services, and workers are hired to perform the work. Thus LEAP had to find a way to gather information on all

three parts. Figure 1 below illustrates the relationship between these market elements and the potential data sources LEAP considered.

**Fig. 1 Three-part Market Relationships**



## 2. Survey Instrument and Methods; Defining the Questions and Process

### Community-based assessment

The LEAP assessment process was based on the assumption that *local* relationships and *local* knowledge can be a cornerstone for building *local* participation in shaping the *local* economy. It was clear that hard quantitative data on the changing resource management industry (that can give community practitioners a handle on steering the industry toward positive landscape, community and economic outcomes) would be hard to come by. Available industry and employment information is mostly aggregate data useful at a statewide level only. Because of inconsistencies in reporting, and the mismatch between industry and occupational categories, and the mismatch between both of these and the changing reality on the ground, much information of interest was not reported or gathered, or remains buried in other industry or occupational categories. There is often no way to tease out the information needed locally.

Thus the LEAP assessment process relied heavily on convening an Advisory Board that could identify the key local information sources, structure the survey instrument in a way most likely to gain respondent interest and cooperation. It was clear that local relationships and knowledge were needed to craft a respectful and sensitive approach to gaining the needed information. The group quickly determined that participation by local land managers and contractors required a methodology that guaranteed anonymity for the respondents, and would present data only in the aggregate, offering no way to identify any one participant's responses. The Advisory Board included practitioners from private industrial forestry, watershed councils, federal land management agencies, service contracting, the workforce, community college education and training, forestry and watershed extension education, and community and economic development. The combined contributions of private and public land managers and the local forestry extension agent were perhaps the most important ingredient in the assessment process. Their perspective, knowledge of the industry and contacts allowed for 1) a very broad sample of land managers, and 2) survey questions that yielded a much higher response rate than other similar local studies have achieved.

### **Preliminary Research**

Early investigation revealed problems with existing industry and employment research categories. There is a clear mismatch between what exists on the ground and the available Standard Industry Classification codes (SIC codes), currently being revised at the national level. It is as yet unclear what SIC categories need to be counted to get a picture of the emerging industry. Furthermore forest and watershed ecosystem management activity comprises only a very small portion of some industry categories. For instance, culvert up-grading work is a central activity in the watershed restoration agenda. Yet it comprises only a very small portion of SIC 1711 (concrete work). Furthermore, occupational data categories do not easily fit SIC categories, *or* what is actually going on in the changing industry<sup>1</sup>. This led the assessment planners to work with other practitioners in the state to develop a list of relevant “work types” (See Appendix) that could be used with land managers, contractors and workers as a common reference point. The next step was to come up with a list of relevant SIC codes in spite of the imperfect nature of their fit with local industry structure and work categories of interest. (See Appendix for SIC category list and definitions included in the contractor survey instrument.). The assessment needed to determine at least what SIC codes contractors use to report employment information to the state.

LEAP planners also decided to review Oregon Employment Department Data for the two counties to get a picture of trends over time. Oregon Employment Department data for 1989 through 1996 was requested by the Ecosystem Workforce Project and provided to LEAP as background information for the assessment. (See Fig. 2 below.) The data series shows a clear leveling off in the decline in logging employment in the two counties (SIC 2411). Forestry services (SIC 0851) employment, including tree planting, thinning, site preparation and other forestry related activities, showed a similarly level employment trend through the period, though hovering at and below two hundred workers in the two counties—a much lower level than logging employment. This gave

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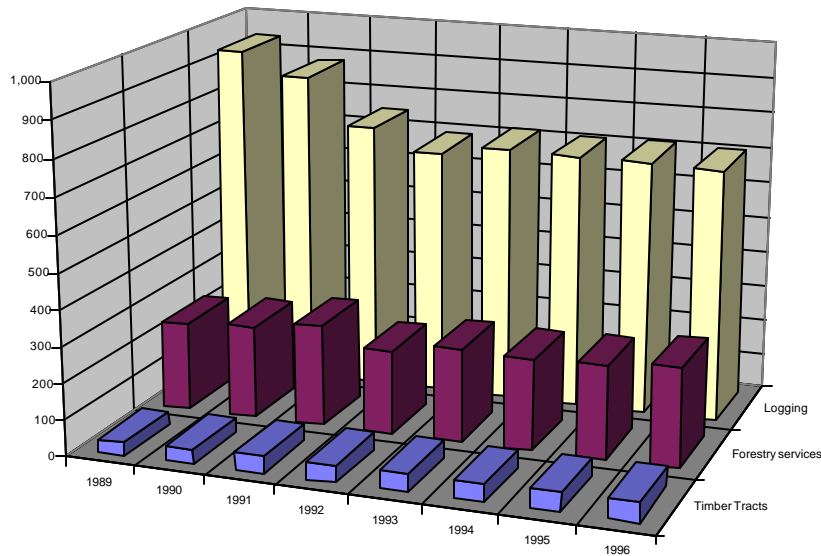
<sup>1</sup> A new Ecosystem Management Worker category has been added to the Dictionary of Occupational Titles. However, this category is not yet widely tested or acknowledged.

one measure against which to compare the quantitative and qualitative observations drawn from the planned survey of resource managers, contractors and workers.

### Geographic Scope

In the search for measures of demand for ecosystem management work assessment planners settled for a less-than-ideal balance between the geographic scope of data gathering on the demand side and on supply side. Most of the land and resource management demand data were gathered within the contiguous Coos, Coquille, Two-mile, Four-mile, and Ten-mile Watersheds—those of immediate interest to the initiators of the assessment. Thus most of the data gathered relates to this short list of watersheds. However, some of the contractors surveyed were based in other parts of

Fig. 2 Coos & Curry Employment, Selected Industries; 1989-1996  
(Source, Oregon Employment Dept., 1998)



Coos County or in Curry County to the south. It was thus considered useful to gather existing employment data for the two county area and to accept some survey responses from outside these watersheds. Few workers or contractors can fill their work year working only in this area, and many contractors and workers based in other communities in the two-county area are employed in these watersheds.

### Defining the Work



The Advisory Board faced the difficult question, “What *is* the industry we’re studying?” The difficulty is compounded by the fact that, as one contractor put it, “Everything is changing!” The difficulties with existing industry and occupational categories identified above stems in part from

this rapid transition in the industry. The assessment was developed primarily to help local practitioners determine if and how a high-skill, multi-disciplinary contractor and worker base could be developed as a necessary ingredient for sustainable resource management. Both factors led the assessment planners to create a list of “work types” that would, as much as possible, be commonly recognized by survey respondents, and would reflect the current wisdom as to what activity is involved in watershed and ecosystem management broadly. Watershed councils, educators, contractors and workers including those involved in recent community-based, ecosystem workforce training programs, were consulted in order to develop a useful list of work type categories. (See Appendix) Specific resources consulted included the Ecosystem Workforce Project’s training curriculum (developed by Oregon State University Extension Service), the Rogue Community College curriculum used by Rogue Institute for Ecology and Economy in Jackson County, Oregon, and industry assessment materials and a workforce training curriculum from the Watershed Resource Training Center in Hayfork, California.

### **Defining the Survey Sample**

To characterize the complex and changing local industry, resource managers, contractors and workers had to be addressed, as each play a critical in the flows of work and dollars, and defining industry structure, behavior and performance. LEAP faced the challenge of identifying respondents in each of the three categories who could provide a good snapshot of 1997 activity, as well as projections for 1999. Without the critical role of the Advisory Board, this step would have been impossible. The Board was a real connection to the local industry through real participants and their working relationships. The role of the Advisory Board was critical in identifying ten land management entities representing almost all of the key resource management activity in the five-watershed area of the study. Jim Clarke, Ralph Duddles and Paul Slater were especially helpful.

Contractor respondents were identified from several sources. Oregon Economic Initiatives, Inc. provided lists of over 150 contractors from the State of Oregon’s list of licensed Oregon contractors, and from the work of their Government Contract Acquisition Program, designed to assist contractors in securing work through the public agency procurement process. Four private industrial land managers, the forestry extension agent, Forest Service and Bureau of Land Management partners also provided lists of contractors known to be operating in the area. From these sources, LEAP developed a list of thirty-two contractors known to be active in the area and who could be contacted. Most of the other contractors listed by the various sources were based out of the study area and did most of their work outside the area. Ma

ny had gone out of business, changed their name, or changed their core business activity. From this list of thirty-two seventeen were successfully contacted and provided with a copy of the

contractor survey instrument. Only five of the contractors contacted agreed to complete the survey. All were based within a fifteen-mile radius of Coquille in Coos County.

### **Survey Instrument and Method**

LEAP needed to gather different information from each of the three parts of the local industry: land managers (the demand for service), contractors (the supply of services and demand for workers) and workers (the supply of labor). Thus three separate survey instruments had to be developed. The original intent of the assessment was to conduct interviews with all respondents, ideally in person, by telephone if circumstances required. The survey instruments were developed by LEAP volunteers with the assistance of the Ecosystem Workforce Project, and were designed to be administered in an interview setting. Many of the questions involved complex issues involving industry or work type category definitions. In addition LEAP anticipated resistance to the survey because of the time required and because all respondents could reasonably be expected to be suspicious of any such survey. It became clear throughout the assessment that the community-based survey gained more trust than any “government” identified survey could have done. Though this was anticipated by LEAP, planners knew trust would be a problem and felt one-on-one interviews with adequate interviewer training would be necessary.

The key methodological issues in designing a successful survey were the issues of trust and the difficulty in assuring complete understanding of the questions and thorough completion of all questions. In spite of the advantage of local participation in locating respondents and crafting survey questions for maximum response rates, there was understandable reluctance to answer some questions, especially those perceived to reveal information that could hurt the respondent’s competitive position in the local industry.

The survey design process dealt with these issues in a number of ways. After setting up the Advisory Board, LEAP set up a meeting to formulate a consensus on what questions were most important to ask. From this initial feedback, three separate trial surveys for each of the three respondent groups were developed and presented to land managers, contractors and workers in the study area. Feedback was gathered on each of the survey instruments. The process provided valuable insights on *what to ask* and *how to ask it*.

LEAP asked managers how they were currently reporting information to their headquarters. This allowed LEAP to adjust the survey design to be more easily answered by land managers. For instance, respondents were offered the choice of providing measurement of work volume based upon dollar amounts or hours worked, or both. One land manager observed that “too many details are being requested. Our corporate policies won’t allow release of this specific information.” Some respondents simply did not have the time required to provide information in an interview format

Contractors interviewed during the survey design process also commented on their difficulties with such a survey. Some were busy with year-end fiscal reports. Some thought there were too many questions. Others did not see why it was in their business’ interest to participate. General

mistrust of the purpose of the survey was also a problem. During the final survey process, LEAP interviewers provided background information on the survey. Some respondents equated the use of the word *ecosystem* with some form of radical “environmentalism”. Further explanation was necessary to allay their fears. In some cases contractors were unwilling to be respondents.

Finally the survey design process helped LEAP see that the basic skills involved in completing responses to a written questionnaire might be beyond the level of some workers. Many of the workers in the area did not complete high school or had language or cultural barriers. LEAP concluded that special efforts were needed to assure all worker respondents were interviewed in person.

These special efforts to shape the questions and approach to the survey paid off. For instance, in the case of the land manager survey, once the reasons for the project were explained and respondents reassured as to the anonymity of their responses, almost all of the major forest land managers in the study area eventually responded to most of the questions.

Using the insights gained during the design process LEAP completed the final survey instruments and trained volunteer interviewers, again benefiting from the survey trial interviews. Once the respondents were identified, appointments were made with the person determined to be most knowledgeable about the work performed or procured. Of special help with worker interviews was the involvement of some of the 317 Weyerhaeuser workers affected by the cutbacks in the western timber division. Dana Mills and Gary Thies, peer advisors for the laid-off forest workers, were especially useful, taking the survey training and helping to administer worker surveys.

Trained LEAP volunteers were successful in interviewing all of the workers, and some of the land managers and contractors. In all cases there was enough direct or telephone contact with respondents to properly define the categories and concepts used in the survey. Many respondents, however, completed their surveys on their own, as time allowed. They interpreted or applied the findings as fit their particular circumstances.

### **The Limits of the Survey Data**

Once the survey was completed and data analysis began, it was clear many questions were not understood, and often simply ignored. The low quality of some responses and the frequent missing data meant that the assessment results could not consistently be relied upon for quantitative accuracy, and thus cannot be viewed as a definitive picture of what is. This is the main limiting factor in the survey results and must be emphasized in drawing conclusions from the survey results. As is always the case with social research, what we end up with should be assessed not as “fact”, but for the “strength of association” between key variables, and whether it serves to raise our understanding of the local industry.

### 3. Findings

#### Land Management- Assessing the Demand for Contractor Services:

Survey responses from land managers indicate substantial labor expenditures in Coos and Curry Counties, most of it for timber management activities. Much of the demand, however, was for watershed restoration and other ecosystem management activity. Over nine million dollars aggregate labor expenditures were projected for 1999 in Coos and Curry Counties by the ten respondents—only six percent below the estimated amount for 1997. Most of the respondents indicated projections were difficult to make; thus conclusions cannot be drawn about 1997 to 1999 differences, only that most respondents expected 1999 figures to be comparable to histories for 1997. Of the ten respondents, seven represented private industrial land owners, one represented a watershed council, and three were public land managers. Advisory Board members active in the industry were not surprised at the total labor demand represented in the land manager responses. Clearly there is substantial labor demand. But is that changing over time, and how does the demand break down for the various work categories?

One objective of the study was to compare historical data with future projections in order to provide some sense of what contractors and workers can expect. Following advice of the Advisory Board and lessons from the trial surveys, LEAP decided to request historical data for 1997 only, in order to make the survey process manageable for research volunteers and respondents alike. Lacking a data series over time, and given the difficulty land managers had projecting future demand it was impossible to get any true indication of projected change in the level of demand in specific work categories. Thus, the comparison of 1997 and 1999 data from the survey alone indicates only that most saw no particular reason to expect major changes in demand. Oregon employment data for the related SIC codes in these counties show fairly level employment through the past few years. (See Fig. 2 above.) This tends to support the expectation of generally level demand in the near future.

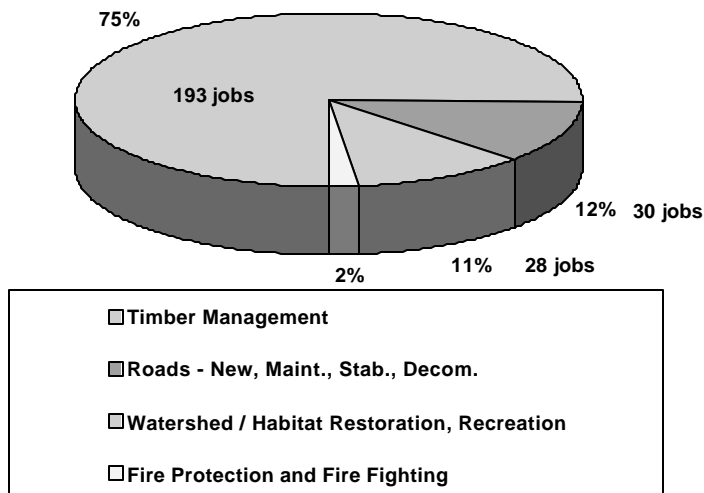
**Table 1. Total Labor Expenditures by Work Category, 1997 & 1999**

	1997		1999	
	Labor Costs	%	Labor Costs	%
Timber Management	7,397,137	75.4%	7,049,542	76.57%
Roads – New const., maint., stabilization, decommissioning.	1,149,560	11.7%	1,211,260	13.16%
Watershed / Habitat Restoration, Recreation	1,088,228	11.1%	903,322	9.81%
Fire Protection and Fire Fighting	180,456	1.8%	42,376	0.46%
TOTALS:	9,815,381	100.0%	9,206,500	100.00%

As many would expect, survey responses indicate aggregate land management demand is greatest in timber management work categories (75% in 1997). But watershed and habitat restoration

activities accounted for 11% of the aggregate labor dollars spent. This represents a potential total of 28 full season jobs<sup>2</sup>. (See Fig. 3 below) If we add to that a portion of the road work<sup>3</sup>, and consider that many businesses and workers adapt to doing both timber management and restoration activities, there are clearly possibilities to structure demand so that local businesses and workers have opportunities in this work.<sup>4</sup>.

**Fig. 3 Total Labor Expenditures by Work Category, 1997**



The Advisory Board anticipated that it would be difficult, especially in the changing industry, for any land manager to anticipate demand, even for the coming year, much less two to five years into the future. So LEAP attempted to ask for a picture of key likely future scenarios, each one with different estimates of demand. However, only general answers were given to questions probing for such future scenarios, and the key factors influencing those scenarios. It is likely that failure to provide for a consistent interview format led to low results here. Generally factors fell in the following categories:

- Funding
- Policy
- Timber Harvest Levels
- Regulation

<sup>2</sup> Estimates of job creation in this report assume steady employment for a ten-month work year, and an average direct labor cost of \$25 per hour (includes payroll taxes, workers compensation costs and any benefits provided). This figuring is provided only to estimate potential quality job impact of labor expenditures. The actual employment patterns are likely to have varied widely from this model, with many more individuals hired over shorter periods of time, some hourly labor costs being lower and some higher.

<sup>3</sup> Survey answers combined new roads with decommissioning and stabilization work—the latter falling into the watershed restoration category and including labor intensive projects as well as the less labor intensive heavy equipment projects

<sup>4</sup> See Appendix for work type subcategories.

## ▪ Markets/Prices

## ▪ Competitive business factors

In an attempt to probe perceptions of demand for workers skills, land managers were asked if they ever needed more qualified or more highly trained workers than were available. Only one of the seven responding said, “yes.” The mission and structure of each of the land management units varied widely. So it is difficult to conclude much from these responses. In many cases land managers have little direct involvement in the selection of workers by contractors for bid work. Clearly, though, among the respondents there is little perception of a skill base shortage.

**The Contractor Experience; Forestry Services and Technical Contractors:**

Contractors provide the *supply* of services to meet land manager demand, which translates into *demand* for labor from available workers. Thus contractors play a pivotal role in the labor market and are a critical indicator of the level of economic *and* social capital in the community. Contracting in all phases of forest management has always been highly competitive. But today contractors are lacking even a roadmap to the future of their industry. Many are pioneering to define a new industry; many more are finding dead ends.

Only five contractors responded to the survey. Within the limitations of the survey, it is clear contractors tend to see watershed restoration work, to the extent it is available, as good for their businesses. This was a consistent response among the respondents. However the sample size and the difficulty in gaining the trust necessary to gather significant labor demand information meant that little was learned about the *quantity* of demand. Further, the survey provided little evidence as to the *quality* of jobs available.

**Contractor Activity by Industry Sector:** A major constraint in any employment research in the emerging ecosystem management industry is the mismatch between what exists on-the-ground and the available Standard Industry Classification Codes (SIC codes). It is difficult to determine what SIC categories need to be counted to get a picture of the emerging industry. (See “Survey Instrument and Methods.,” “Preliminary Research” above) It will continue to be very difficult to get an accurate reading on industry or employment activity from SIC-based data.

The survey respondents typically work in multiple industry categories (See Table 2 below). The data fit with anecdotal evidence that contractors are having to diversify (and in varying ways) in order to stay in business.

**Table 2. Percentage of Contractor Activity by Industry Category**

SIC	Description	Case 1	Case 2	Case 3	Case 4	Case 5
811	Timber Tracts	60%				(NR)
831	Forest nurseries					
851	Forestry services		50%			
1442	Construction, sand and gravel	40%	20%	50%		
1611	Highway and street					
1629	Heavy construction		20%	50%		
1711	Concrete work		10%		100%	
1781	Well drilling					
2411	Logging					
	Totals:	100%	100%	100%	100%	

**Employment Levels and Use of Local Workers:** The five employers reported employing 150 workers in 1997. Of the total workers reported 71% were permanent workers and 29% were seasonal employees. From interviews conducted it is clear that many respondents included among permanent employees workers who work only part of the year. Thus it is impossible to make assumptions about duration of employment or annual wages of workers involved.

Most of the work these contractors did in 1997 was in the Coquille and Coos Watersheds. The survey data show 108 (69%) of the total employed were Coos or Curry County residents. Among permanent employees reported, 82% were Coos or Curry County residents, while only 35% of seasonal workers were residents. And a majority of the non-residents were seasonal employees. But the nineteen non-resident permanent employees are perhaps an indication of un-met demand for local workers.

**Compensation:** The average hourly wage for the 114 employees for whom wage data was provided was \$12.09/hour. However, 46 of these (40%) were heavy equipment operators or truck drivers with wages ranging from \$10 to \$30 per hour, skewing the average upward. This concentration of employment in these occupational categories fits with land management data showing major investment in road and related work. Most of the other non-managerial employees reported (who are also most likely to experience irregular employment over short periods of time) earned considerably below the average. Some workers received benefits either partly/completely paid by their employers. Other workers had no benefits at all. Most respondents said they would bid on more watershed restoration work if trained workers and training for current employees were available.

## **The Worker Experience**

Workers surveyed tended to validate the conventional wisdom among forest workers that even trained ecosystem management workers will not be able to enjoy the wages they might have received in timber management work or logging. Timber management jobs still provide better pay and benefits. But it is also clear from the survey that decent, family supporting wages can be paid for well-trained workers.

**Compensation:** Twelve workers responded to the survey, of whom six were trained ecosystem management workers employed in watershed restoration work. These workers were among over thirty Jobs-in-the-Woods and Hire the Fisher workers trained in ecosystem management through the Coos and Coquille Watershed Associations. Their wages ranged from \$12 to \$15 per hour. These workers averaged two and a half years with the same employer. Among the five workers doing timber management related work, wages ranged from \$13 - \$17 per hour. These workers reported being with the same employer over 17 years on average.

**Job Satisfaction; Looking to the Future of Training for Ecosystem Management:** Five of the six watershed restoration workers reported being satisfied with their employment. Only one of the remaining six workers reported being satisfied in his current work situation. All but one of the twelve were interested in increasing their skills, and all twelve would take a job in watershed restoration or ecosystem management work if it were available. All twelve said they would participate if they had access to ecosystem management training. Both traditional and ecosystem management workers were eager for opportunities in watershed restoration work. This strong evidence of interest in the new, more technical work supports the notion that workers want to stay in work connected to the landscape, and have little resistance to shifting to technical work.



#### **4. Implications for Rural Communities and the Shift to Ecosystem Management**

The LEAP assessment tends to support the notion that there are indeed opportunities for local workers and businesses as landscape management changes. It also reinforces concerns that the transition is a complex one and it is by no means assured that good jobs and stable businesses will be the end result of the transition.

**Leading the Way to Watershed Restoration in Coos and Curry Counties:** The Coos and Coquille Watershed Associations have been leaders in Oregon's watershed agenda, making early progress to assess the watersheds and get restoration work and monitoring under way. Both associations include the social and economic health of their communities in their mission statements. Both associations cooperated to provide for training of Jobs-in-the-Woods and Hire the Fisher workers in 1996 through 1998, and continue to fill some of their need for skilled workers by employing these workers either through direct-hire or contract with local businesses employing trained workers. It is likely that the encouraging survey results on the quantity of demand for watershed and ecosystem management work is in part a result of these watershed associations' leadership.

**Difficulty in Assessing Quantity of Demand:** The Advisory Board concluded that the study provided little help in projecting the quantity of demand by work category. However forestry and watershed restoration practitioners on the Advisory Board concluded that the survey results on land management demand "rang true." The group also concluded from the study results that up to 23% of over \$9,000,000 estimated labor expenditures represents work that was not there six years ago. Much of this may be road building or maintenance work that is not new; and we have to be cautious in concluding anything about new work. But the survey clearly supports the notion that the ongoing transformation of the industry can keep some people working in the woods. Due to the early lead taken by the Coos and Coquille Watershed Associations, it is possible that these hopeful signs may not be evident in other rural Oregon communities.

**Difficulty in Assessing Job Quality:** It remains very difficult to gather enough information to build a quantitative analysis of compensation levels, job stability and durability, skill content or job satisfaction. Further, there was little evidence in the survey results that work is consistently structured to favor contractors who maintain stewardship capacity by retaining high quality workers and equipment. However it is clear that there are no fixed structural barriers to creating jobs in ecosystem management that pay \$12 to \$15 per hour. Furthermore, there was a clear perception of opportunity among the twelve workers surveyed. All of the twelve workers surveyed indicated interest in diverse ecosystem management employment opportunities. As one worker put it, "I know the wages won't be as high as I got logging, but if I can cover family expenses I really like to be able to get more of this work."

**Learning from the Community-Based Research Model:** Advisory Board members agreed that as difficult as this kind of on-the-ground social research is, the patient involvement of multiple stakeholders in planning the study was the main factor in gaining wide land manager participation

and in framing all three surveys for maximum possible responses. This advantage accrued from both the local knowledge Advisory Board members brought to the study and the trust built with potential respondents through involvement of peers in planning the study.

**Models for Ongoing Assessment:** The relationships built through the assessment process may be difficult to maintain. But it is clear that the questioning and theory-checking that went on throughout the assessment process can be adopted as a style of work, whether a formal survey is conducted or not. Watershed councils, local community economic development practitioners and resource managers concerned about social and economic impacts can apply this approach to deepen their understanding of how to link landscape, social and economic objectives. Whether through formal surveys, informal focus groups, strategic planning sessions, or simply making a habit of asking, “what do we know about the local industry; what can we find out?” and “What are the likely economic impacts of doing *this* action *this* way?” making those linkages can become a reality.

## **APPENDIX I**

### **Work Type Categories**

#### **Timber Management**

Tree Planting  
Site Preparation  
Thinning Pre-commercial  
Thinning / Commercial  
Pruning  
Hand Herbicide Application  
Animal Damage Control  
Fertilization - Hand/Aerial  
Timber Harvest Layout  
Timber Cruising  
Stand Exam  
Other Construction  
Roads-New, Maint., Stab., Decom.

#### **Roads-New, Maint., Stab., Decom.**

#### **Watershed / Habitat Restoration and Road**

Culvert - Replace/Improve  
Watershed Assessment/Monitoring  
Watershed Restoration/Treatment  
Wildlife - Inventory/Assessment  
Wildlife - Habitat Creation  
Jobs in the Woods (JITW)

#### **Recreation**

#### **Fire Protection and Fire Fighting**

Fuels Management  
Fire Protection  
Fire Fighting

**APPENDIX II****Survey Instruments**

(See the following seventeen pages for samples of the survey instruments created and used in completing this survey.)