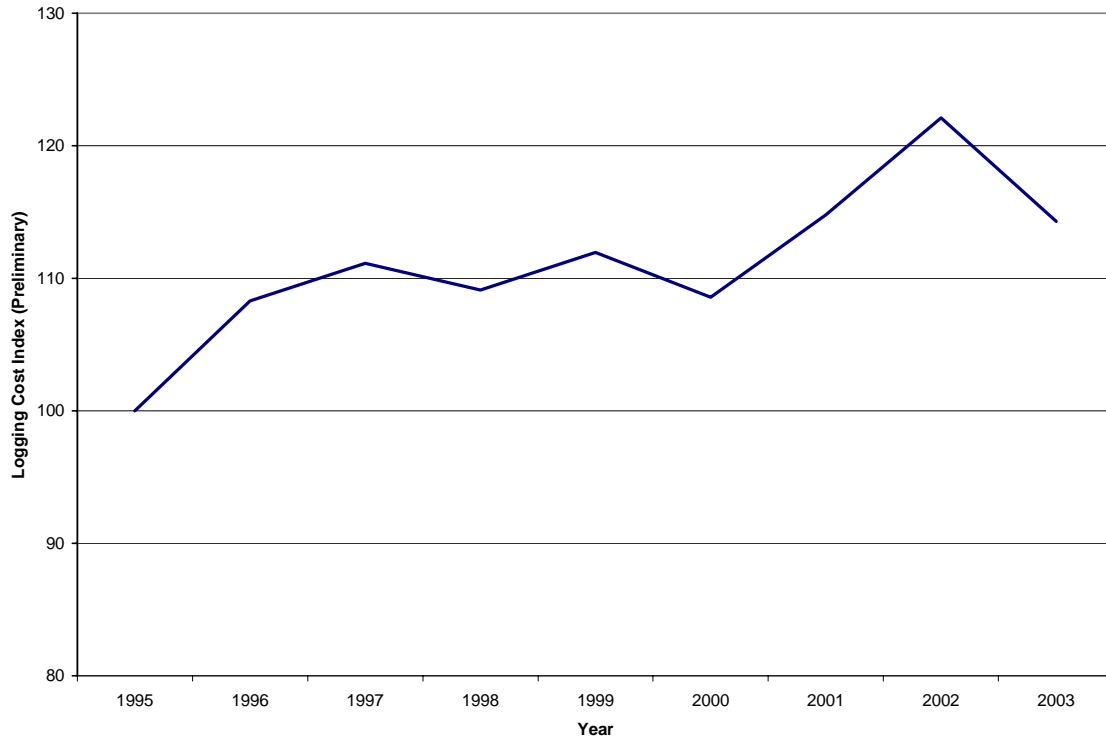


# Preliminary 2003 Logging Cost Indices



1995-2003 Logging Cost Index

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## Preface

The fundamental objective of the Wood Supply Research Institute (WSRI) is to enhance pro-competitive awareness of factors that affect the efficiency, stability, and economic viability of the industrial wood supply system. Thus, the members of WSRI believe that the industry needs some continuous, long-term, credible, index of trends related to the cost of producing wood and the financial health of the system.

The long term cost and productivity study at Mississippi State originated within the Industrial Forestry Operations Research Coop at Virginia Tech in 1990. The study has been supported by the Forest and Wildlife Research Center at MSU since 1999. The objectives of this study have been to monitor the effects of changes in the wood supply system on logging business performance, to monitor the effects of externalities such as weather, tax law, fuel prices, labor legislation on business structures, and gather information and insights that could lead to the development of better understanding of, and management tools for, the wood supply system.

This research project, funded in part by WSRI, is designed to expand the current work being done at Mississippi State and to enhance the dissemination of this index to a broader audience.

This report, presents a preliminary 2003 index based on a sample of 31 contractors for whom complete data were available on 10/15/2004.

This is the fifth in a series of reports from this project. The first dealt with basic issues of developing a set of indices that would have utility for harvesting contractors, procurement and management foresters using a base population of 25 contractors for whom seven years of data (1995-2001) were available. The second used an expanded population of 37 firms to assess the potential instability in the indices as the number of firms expanded. The third provided preliminary estimates of the 2002 indices based on a sample of 36 contractors and descriptive information concerning the 42 firms included in the sample population at the end of 2001, the fourth presented the 2002 index.

Stuart, W.B., L.A. Grace, B.D. Jackson, and R. Stutzman. 2003. [Logging Cost Indices](http://www.cfr.msstate.edu/forestry/Q1_IndicesWSRI_R1.pdf). (http://www.cfr.msstate.edu/forestry/Q1\_IndicesWSRI\_R1.pdf. 23 pp.

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Stuart, W.B., L.A. Grace, C.B. Altizer. 2003. [Preliminary 2002 Logging Cost Indices and Demographics of Participating Firms](http://www.cfr.msstate.edu/forestry/WSRI_R3.pdf). http://www.cfr.msstate.edu/forestry/WSRI\_R3.pdf. 30 pp.

Stuart, W.B., L.A. Grace, C.B. Altizer. 2004. [Final 2002 Logging Cost Indices and 2003 Update](http://www.cfr.msstate.edu/forestry/WSRI_R4.pdf). http://www.cfr.msstate.edu/forestry/WSRI\_R4.pdf. 14 pp.

# **1 Preliminary 2003 Logging Cost Indices**

## ***1.1 Introduction***

Capturing logging cost and productivity information is a process that is never complete, but the effort, to be of value, must provide timely indicators. The indices presented here are still preliminary, and will be updated as the data sets for the remainder of the participants are completed.

## ***1.2 Population***

These indices are based on information from 31 firms for which complete data for 2001 was available on October 15, 2004. The 31 firms produced a total of 3,217,037 tons of wood with annual expenditures of \$46,421,717. This represents 78% of the volume and 73% of the expenditures of the contract set of the 2002 final report. Thirty of the 31 contractors participated in both 2002 and 2003.

These firms are spread over a wide area, the Lake States, the Appalachian region, the majority are in the Southern Piedmont, and on the Coastal Plain. Differences in land forms and forest ownership patterns within physiographic regions, the mobility and versatility of the operations and changing markets make stratification difficult. Many of the operations are located near the fall line, the border between the coastal plain and piedmont and work in both regions. The Gulf South coastal plain includes land forms and land ownership patterns similar to the Eastern piedmont.

The population includes firms that harvest pine and hardwood sawtimber, pine and hardwood pulpwood, thinning operations, chipping operations, and Scandinavian style cut-to-length operations. Many of the participating firms move between thinning and clearcuts, tree-length and merchandizing, and single or multiple crews as the market and opportunity dictates.

### 1.3 Average Total Cost per Ton Index

The 2003 preliminary Average Total Cost per Ton Index, shown in Figure 1, trends downward, and falls below the rate of inflation as measured by the Consumer Price Index (CPI) for the period 1995-2003. The Producer Price Index for Logging (PPI(L)) shows some upward movement for 2003 and 2004. Logging costs, as measured by the preliminary index increased 14% over the period 1995-2003. Prices paid for logging services, as measured by the PPI(L) decreased 13% between 1995 and 2002, then increased by 2% in 2003, and by 3% through the third quarter of 2004. The divergence between the logging cost index and the Producer Price index for the period 1995-2003 decreased to 27%.



Figure 1. Average total cost per ton index, Consumer Price Index, and Producer Price Index (Logging).

### 1.4 Annual Production

The range in annual production per firm, for this preliminary report, continued to expand; the largest firm joined the study during 2002 (Figure 2). The production range of smallest third of the population narrowed, but will likely increase as the data collection and summarization is completed. The range of mid-sized firms expanded downward as a result of the contraction within the smaller category. The larger firms continued to expand; the increase in maximum production is the result of within firm growth.

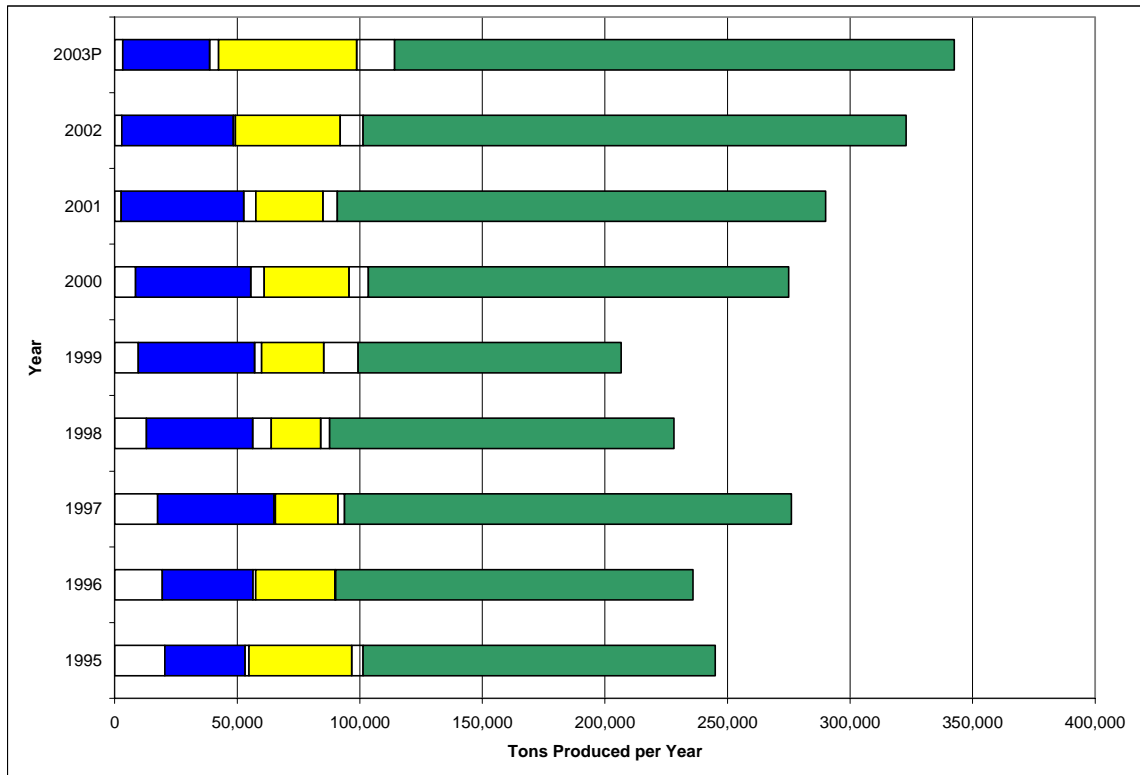


Figure 2. Annual production by firm size. Small firms are indicated by blue, medium firms by yellow, and large firms by green.

### 1.5 Cost Indices by Firm Size

Average total cost per ton continued to increase for the smaller firms, which tend to be hardwood loggers, those performing thinnings, and other specialty harvests, rising eight points in on top of a 20 point rise in 2002 (Figure 3). The index for the mid-sized firms decreased eight points; returning to near the 2000 level. The larger firms experienced a 10 point drop, returning the index to the 2001 level. Mid-sized firms remained the most cost efficient, with average costs per ton three percent less than the larger firms.

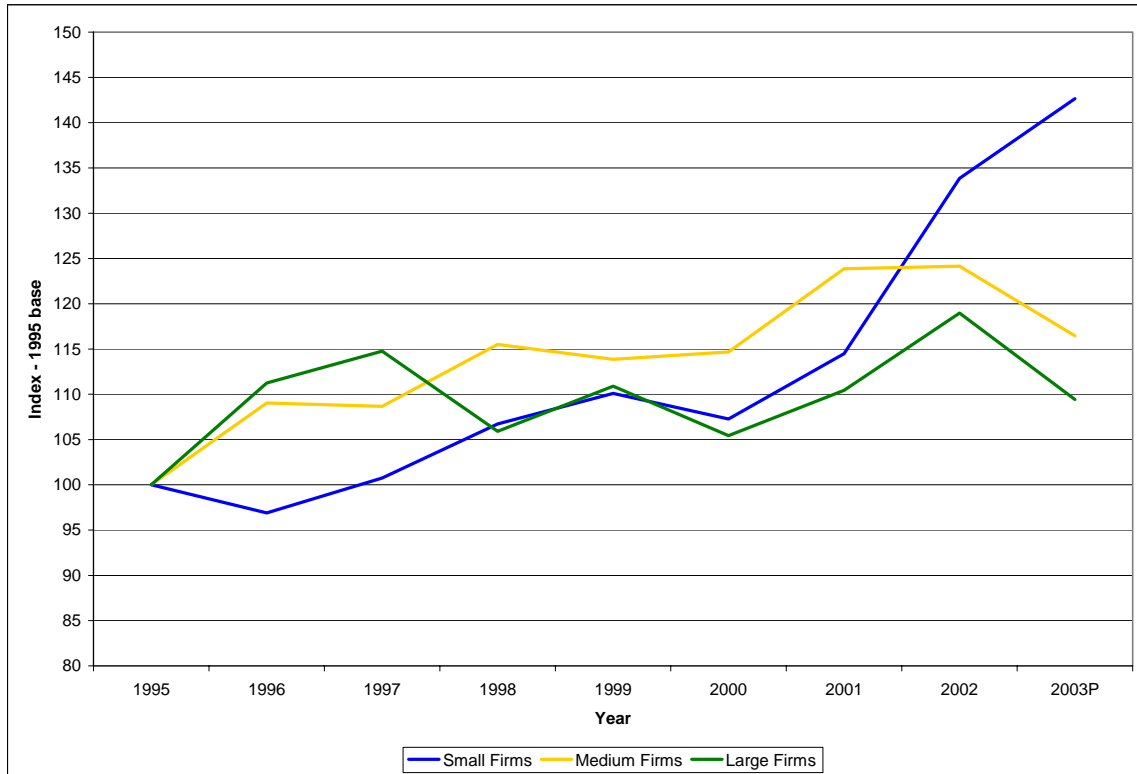


Figure 3. Preliminary average total cost indices by firm size.

## 1.6 Distribution of Total Costs

The percent of total costs going toward equipment continued to decline, dropping 2.2% to the lowest level for the period 1995-2003 (Figure 4). Labor, consumable supplies, and insurance costs increased. Contracted services percentage decreased, largely as a result of the increases in labor and consumable supplies, canceling out some of the 2002 percentage increase. The administrative overheads percentage stabilized.

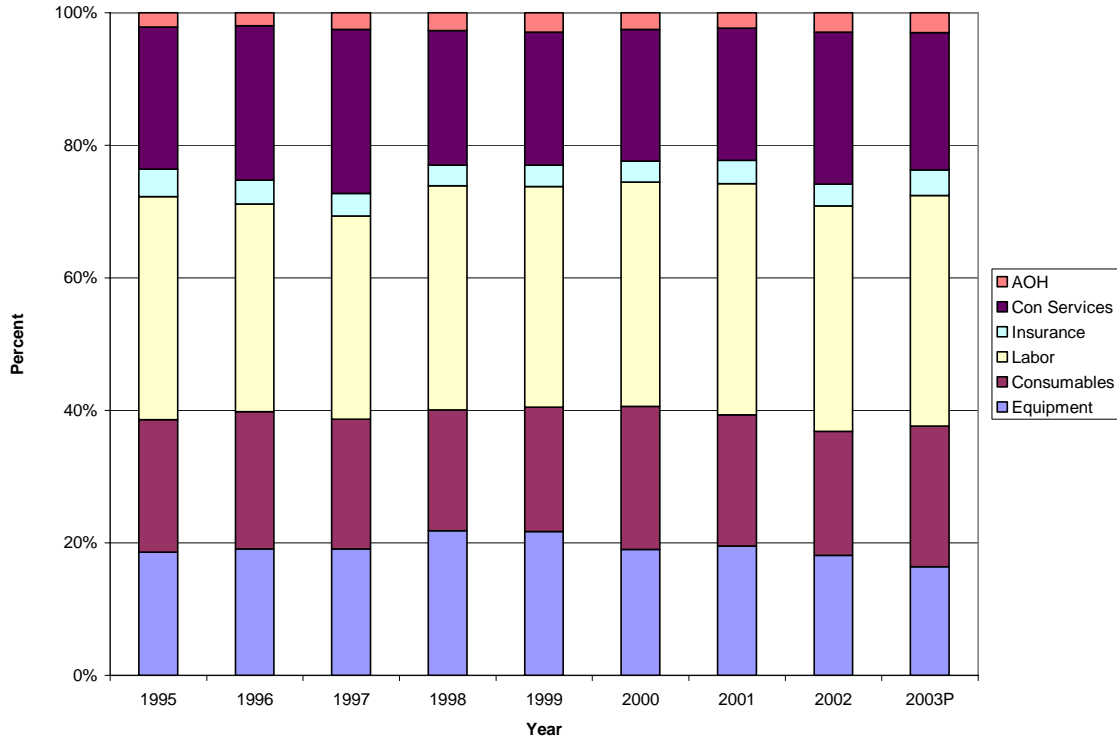


Figure 4. Cost components as a percentage of total cost per ton.

## 1.7 Component Cost Indices

Cost per ton indices for expenditures per ton moved upward for two of the six component costs: consumable supplies and insurance.. The other four fell, contracted services by the greatest amount, followed by equipment, then labor, with administrative overheads showing the smallest decline.





Figure 5a. Equipment cost/ton index.

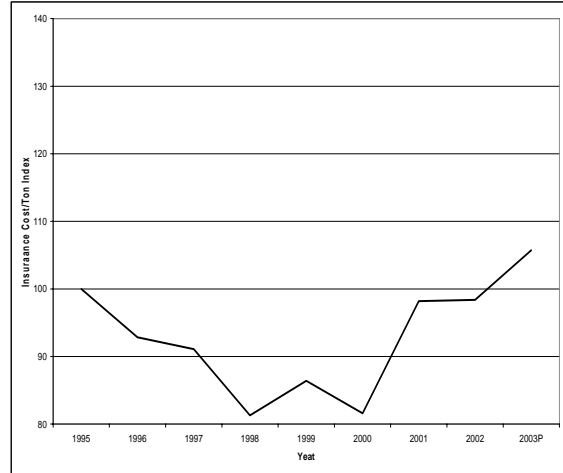


Figure 5d. Insurance cost/ton index.

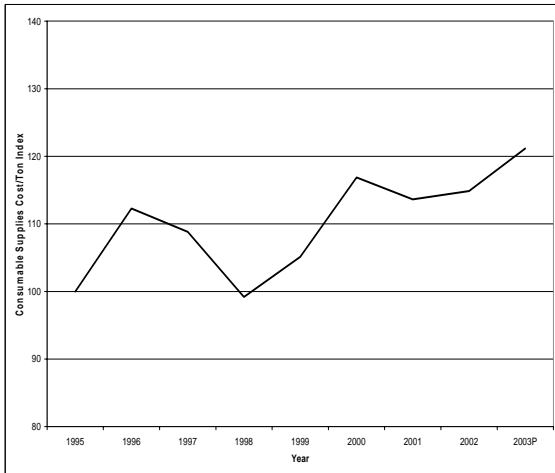


Figure 5b. Consumable supplies cost/ton index.

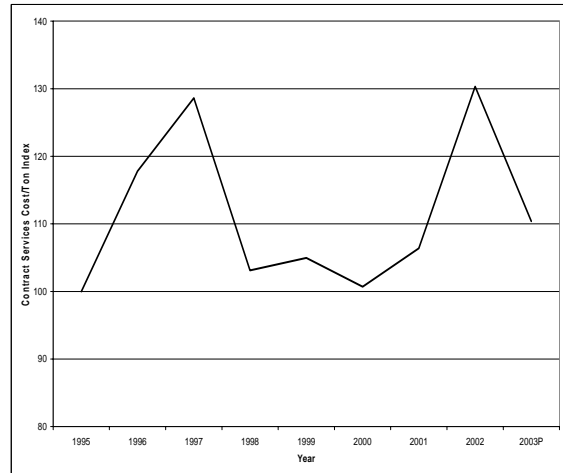


Figure 5e. Contract services cost/ton index.

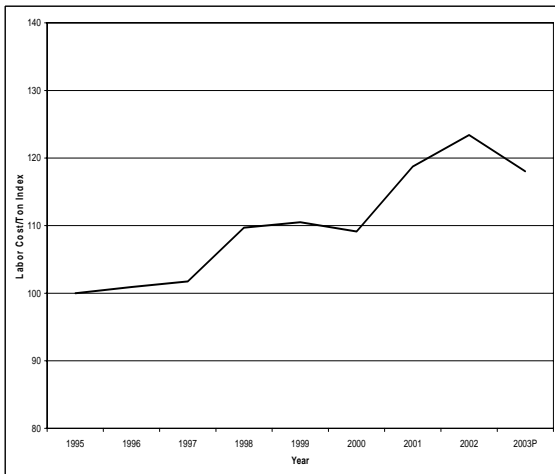


Figure 5c. Labor cost/ton index.

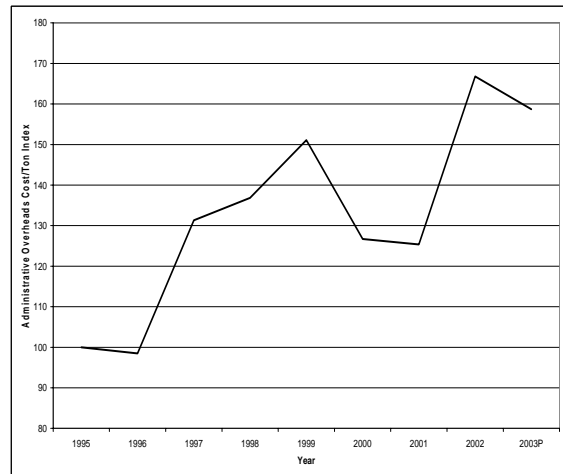


Figure 5f. Administrative overheads cost/ton index.

Figure 5. Component cost/ton indices for all firms.

## 2 Discussion

Thirty of the 31 firms used in this preliminary analysis were participants in the study during 2002. This allowed analysis of year to year, same firm change (Table 1). Production for the group increased 244,000+ tons, costs increased by \$1,856,000+, resulting in a marginal cost per additional ton of \$7.60.

The economies did not come simply by spreading additional production over a constant base of expenditures. The outlays for equipment decreased by two-thirds of a million dollars; business capital was consumed. The marginal cost per ton would have increased to \$10.40 per ton if capital had been preserved.

Some of the reduction in equipment outlays can possibly be explained by the increase in contracted services, notably trucking. The equipment costs are still there, only now included in the contract payments. Expenditures have shifted from dedicated (harvesting) equipment to general purpose (over the road trucks).

Total wages, net of workers compensation insurance and owners' draw declined by about one-half percent, the only other net decrease in outlays. Fifty four percent of that saving was absorbed by the net increase in workers' compensation insurance.

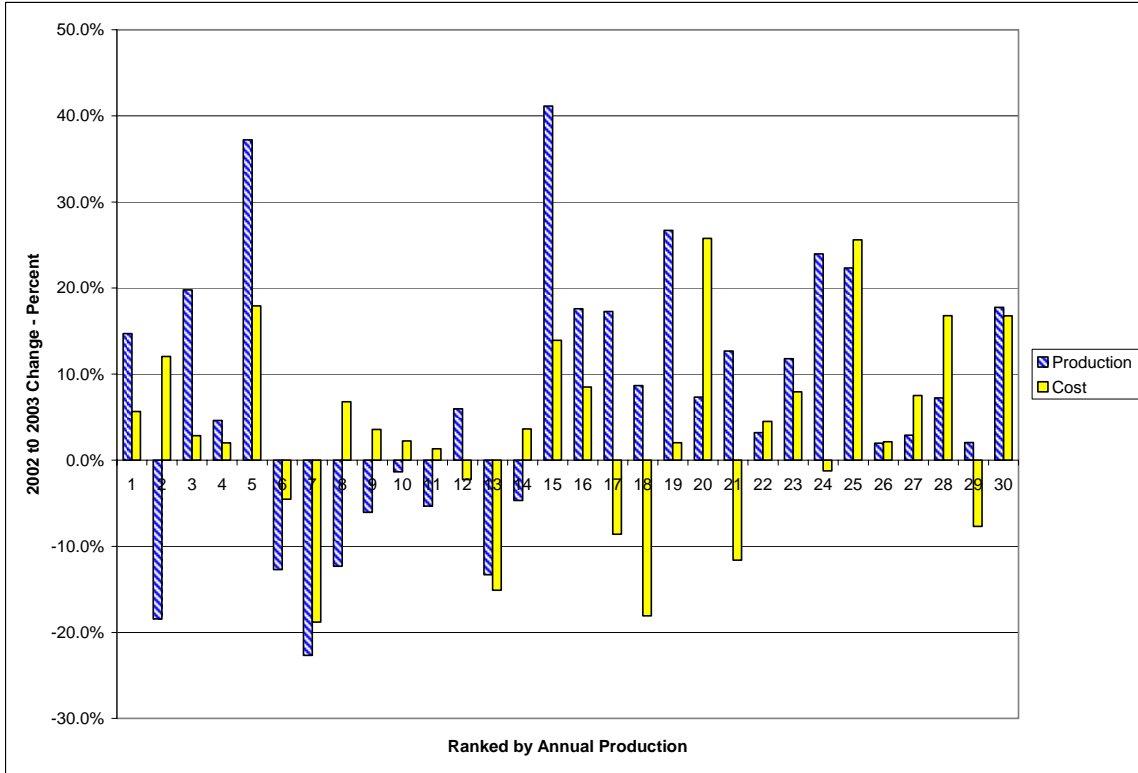
The change in owners' draw is formulaic. By agreement with participants, we do not reveal owners' salaries, and instead use a formula of \$20,000 per firm to reflect the wages of the owner as a working member of the crew (as most are) and an allowance of \$0.30 per ton as payment for management services. The \$72,262 shown ( $\$0.30 \times 244,207$  additional tons) may or may not reflect actual salaries of the owners.

The increases in net outlays for insurance (workers' compensation, general liability, and vehicle) are most likely precursors of continued increases in future years. The percentage change is stated in terms of the net increase over 2002 expenditures. Labor remains the largest expenditure at \$16 million, followed by consumable supplies at \$9.7 million. The \$1.3 million increase in contracted services moved that category to a virtual tie with consumable supplies at \$9.6 million.

**Table 1. Shift in production and expenditures between 2002 and 2003 for 30 participating firms.**

	<b>Shift</b>	<b>Percent change</b>
<b>Production (tons)</b>	244,207	8.3%
<b>Expenditures</b>		
Equipment	-\$685,749	-8.3%
Consumables	\$920,193	10.5%
<i>Labor (w/o WCI)</i>	-\$144,453	-0.5%
<i>Owner's Draw</i>	\$73,262	4.9%
<i>WCI</i>	\$77,788	8.3%
Total Labor	\$6,597	0.0%
Insurance	\$200,787	12.9%
Contract Services	\$1,327,321	16.0%
AOH	\$87,266	6.8%
Total Cost	\$1,856,415	4.2%

The relationship between change in total tons produced and total expenditures is weak (Figure 6). The to change in production and costs between 2002 and 2003 for the thirty firms (ranked in order of annual production with the smallest firm on the left) demonstrates that smaller firms tended to be more volatile, with larger swings in production and cost. Interestingly, no firm larger than 75,000 tons per year experienced a reduction in output.



**Figure 6. Percentage change (2002 – 2003) in total production and cost for 30 firms**

## 3 Project Update

### 3.1 Quarterly Indices

Fifty one firms have agreed to participate in the project; and more are being recruited. However, converting the agreement into action takes some work.

Progress is being made on the quarterly indices. Table 2 is a preliminary set of quarterly indices for 2002 and 2003 based on a population of about 20 firms (the number of firms is indicated for each quarter). These are computed on the same 1995 base as the annual indices. Indices for 2004 were not included because the number of firms with complete data was too small to yield comparable information.

**Table 2. Preliminary set of quarterly indices**

Year	Quarter	Firms	Average Cost per Ton Index (1995 base) by expenditure type						Cost/Ton
			Equipment	Consumables	Labor	Insurance	Cont. Serv.	Adm. Ovhd.	
2002	1	18	118	91	116	102	128	166	114
	2	16	113	104	132	78	138	158	122
	3	17	105	120	117	88	142	174	121
	4	17	133	135	126	94	132	192	130
2003	1	20	91	119	117	90	131	183	116
	2	19	88	118	113	102	111	198	110
	3	19	106	141	116	101	96	138	115
	4	19	117	138	119	134	97	150	119

### 3.2 Constraints

Two problems that are slowing progress; capturing production information and simplifying the reporting process, are being worked on.

#### 3.2.1 Production Information

Quarterly production continues to be difficult to capture. (Most of the firms with incomplete data for 2003 and 2004 are lacking only quarterly production information.) We are offering a program – Loadchaser - to all participants in the project. This program will hopefully

1. simplify the work of reconciling scale tickets with settlements sheets,
2. provide information that will aid in planning and management,
3. while constructing an Excel file of job productivity for our use.

This is an Excel program for entering scale ticket information that can then be sorted by date, market or ticket number to simplify reconciliation with settlement sheets. The resulting data file can be used to construct pivot tables of production by day, week, tract and/or deliveries by market as well as run and Cusum charts of periodic production for the contractors' use, and periodic production information for use in this project.

The program is available free of charge to participants in the project and any other firm willing to share production information with the project.

### **3.2.2 Reporting lags**

Capturing data for this project remains challenging. The pressures on the wood supply system this year, searching for economies to offset the increases in fuel and insurance costs have made the effort more challenging than usual. Support bookkeeping and/or office staff is pressured along with operations. Capturing financial information has been made easier as more firms rely on accountants for tax reporting. Production information tends to lag.

We are hoping that "LoadChaser", used as a stand alone program or as a supplemental report in Quickbooks or Peachtree will help to make production information more readily available.

Most firms or accountants have printed and mailed hard copies of the information in the past. Many were concerned about transmitting data to a destination on a widely accessible university based server. Hard copies have to be re-entered for analysis, which takes additional time.

We now have a dedicated server for this project on line, accessible only by project staff to enable data transfer via electronic files and serve as a communications medium for cooperators.

## Appendix

The following tables provide the source data used to develop the figures in the body of the report. They are numbered and structured to mimic the figures as closely as possible.

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## Appendix

Table A1. Total average cost per ton index, inflation (CPI) index, and producer price index –contract logging (PPI)(Figure 1).

Year	Cost/Ton Index	CPI	PPI- Contract Logging
1995	100	100	100
1996	108	103	96
1997	111	105	98
1998	109	107	97
1999	112	110	94
2000	109	113	91
2001	115	116	86
2002	122	118	85
2003P		120	87
2004P			90

Table A2. Production ranges by firm size class (Figure 2).

Year	Operation Size--Tons per Year					
	Small Firms		Mid-Sized Firms		Large Firms	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1995	20,475	53,172	54,833	96,773	101,352	244,950
1996	19,450	56,403	57,514	89,906	90,239	235,970
1997	17,533	64,926	65,553	91,039	93,771	276,055
1998	12,975	56,278	63,871	84,119	87,722	228,168
1999	9,644	57,170	59,925	85,338	99,334	206,592
2000	8,496	55,596	61,019	95,569	103,507	275,000
2001	2,649	52,633	57,604	85,000	90,862	290,000
2002	2,855	48,447	49,250	92,025	101,337	322,829
2003P	3,275	38,750	42,450	98,751	114,189	342,508



Table A3. Average total cost/ton indices by firm size class (Figure 3).

<b>Year</b>	<b>Small Firms</b>	<b>Mid-Sized Firms</b>	<b>Large Firms</b>
1995	100	100	100
1996	97	109	111
1997	101	109	115
1998	107	115	106
1999	110	114	111
2000	107	115	105
2001	114	124	110
2002	134	124	119
2003P	143	116	109

Table A4. Cost component allocation as a percentage of total cost per ton (Figure 4).

<b>Component Cost</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003P</b>
Equipment	19%	19%	19%	22%	22%	19%	20%	18%	16%
Consumables	20%	21%	20%	18%	19%	22%	20%	19%	21%
Total Labor	34%	31%	31%	34%	33%	34%	35%	34%	35%
Insurance	4%	4%	3%	3%	3%	3%	4%	3%	4%
Con Services	21%	23%	25%	20%	20%	20%	20%	23%	21%
AOH	2%	2%	3%	3%	3%	3%	2%	3%	3%

Table A5. Component cost/ton indices for all firms (Figure 5).

<b>Component cost</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003P</b>
Equipment	100	111	114	128	130	111	120	119	101
Consumables	100	112	109	99	105	117	114	115	121
Total Labor	100	101	102	110	110	109	119	123	118
Insurance	100	93	91	81	86	82	98	98	106
Con Services	100	118	129	103	105	101	106	130	110
AOH	100	98	131	137	151	127	125	167	159

Table A6. Percentage change (2002 – 2003) in total production and cost for 30 firms (Figure 6).

2003 Firm	Percentage change	
	Production	Cost
1 (smallest)	14.7%	5.7%
2	-18.4%	12.0%
3	19.8%	2.8%
4	4.6%	2.0%
5	37.2%	17.9%
6	-12.7%	-4.5%
7	-22.7%	-18.8%
8	-12.3%	6.8%
9	-6.1%	3.6%
10	-1.4%	2.2%
11	-5.3%	1.3%
12	6.0%	-2.3%
13	-13.3%	-15.1%
14	-4.7%	3.6%
15	41.1%	13.9%
16	17.6%	8.5%
17	17.3%	-8.6%
18	8.7%	-18.1%
19	26.7%	2.0%
20	7.3%	25.7%
21	12.7%	-11.6%
22	3.2%	4.5%
23	11.8%	7.9%
24	24.0%	-1.2%
25	22.3%	25.6%
26	2.0%	2.1%
27	2.9%	7.5%
28	7.2%	16.8%
29	2.0%	-7.7%
30(largest)	17.8%	16.8%