

**Opportunities to Increase Productivity of the Industrial Wood Supply  
System Through Improved Planning and Communications**

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# OPPORTUNITIES TO INCREASE PRODUCTIVITY OF THE INDUSTRIAL WOOD SUPPLY SYSTEM THROUGH IMPROVED PLANNING AND COMMUNICATIONS

by Brian F. Rodgers

## (Abstract)

Planning is the act of determining the steps necessary for an organization to obtain goals in the future. Planning takes on even more importance as competition increases and additional efficiency is needed. In today's competitive business environment, any method that can be utilized to maintain an advantage over an organization's competitors must be investigated.

Organizations allocate time and resources dedicated to planning differently. Differences are directly related to the goal that is being planned for and the amount of time before the goal is to be met. This study was undertaken to determine what levels of planning and communication were present in the wood supply industry and to determine how information that was being exchanged was being used in these processes.

During 2001, Virginia Tech Forestry Operations researchers completed a study to assess the current state of planning and communication in the industrial wood supply process and to identify opportunities for improvement. Researchers performed interviews with 169 individuals representing all segments of the wood supply system. Interviews were performed during the summer of 2001 in the southeast and northeast regions of the United States.

The overall findings of this study showed that current planning in the wood supply system is primarily 'reactive' rather than proactive, resulting in extremely short planning horizons for all segments of the wood supply chain. This is due in some part to the high degree of uncertainty facing the forest and logging industries in today's business climate, but is also a result of a continuation of traditional business practices that promote inefficiencies in the wood supply chain.

Frequent, short term changes in mill requirements, including delivery schedules, inventories, and specifications, drive many of the constraints to planning in the wood supply system. Thirty-five percent of the wood procurement organizations interviewed reported that the consumption mix at their mill often changed on a weekly basis, and 65% reported they typically receive only one or two week's notice in advance of significant changes in mill wood requirements.

Advances in communication technology, such as cell phones, are facilitating frequent verbal communications between all segments of the wood supply chain. These communication improvements are also a factor in reducing the planning horizons for suppliers. As consumers adopt and use these communications technologies they are being used to actively manage daily (rather than weekly, monthly) wood flows as "just-in-time" inventory management goals. While 60% of the loggers interviewed reported they communicated at least twice a week or more with their wood dealer or procurement forester, 70% reported that these communications were only "somewhat" or "not helpful" in planning their production goals.

More than 75% of the contract loggers interviewed know the location and characteristics of the next tract they will harvest less than one week before they move their equipment and begin harvesting operations. This common and wide-spread industry practice of delaying critical information to loggers with regard to tract allocation creates a barrier to effective operational harvest planning, and provides one of the greatest opportunities for substantial cost savings through improved planning and communications.

Compensation rates for logging contractors are primarily determined (70%) through the application of consumer's logging cost models or dealer's "market" rates which facilitate little if any true negotiation for harvesting system cost items. These models are generally based on projected "average" production rates that do not reflect consumer-imposed constraints such as quota reductions, additional mandated moves, or tract allocation "mismatches".

Efficient and predictable wood flow is critical to a stable and profitable forest and logging industry. Mill management and wood procurement personnel should plan their wood

requirements, inventory and delivery schedules on an annual basis and effectively communicate these plans to the appropriate suppliers to facilitate their (suppliers') ability to conduct meaningful long-term strategic and tactical planning.

Without adequate planning all participants of a system lose control and generate inefficiency. Proper planning reduces the likelihood that obstacles will dramatically affect the efficiency and corresponding productivity of these participants. The results are improved productivity and increased return on capital employed.

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## GLOSSARY

Supplier - For the purpose of this project a supplier is any entity that cuts, merchandises and hauls timber to a purchaser. Suppliers are generally independent of wood dealers and consumers in that risked capital belongs to the supplier not the dealer or consumer. Suppliers generally realize a profit by either logging for a rate that meets monetary requirements or by margin between what a product is purchased and sold for.

Consumer – For the purpose of this project a consumer is any entity who buys harvested timber from a supplier or dealer. A consumer may also be responsible for the purchase of standing timber and allocation of purchased (or company owned) timber.

Dealer – For the purpose of this project a wood dealer is any entity that serves as a direct link between a consumer and supplier. Wood dealers may contract with suppliers for volume of raw material or may produce the raw material with their own crews (in this situation the dealer is also a consumer of production from the supplier). Wood dealers generally allow wood to pass through their contract for a fee to the supplier. In some cases the wood dealer will be directly contracted by the consumer to produce a predetermined amount of volume.

Allocation – The process of deciding which tract goes to which supplier in which order. Allocation is normally determined by the procurement organization. In cases of multiple tract packages the supplier may be responsible for allocation of individual tracts.

Compensation – The amount of money paid for a service provided. In the case of a supplier compensation relates to the amount of money paid to bring standing timber from the harvest site to the consumer.

Mill management – For the purpose of this study mill management is an organization of the consuming mill. Mill management can encompass wood yard management and its downstream components as well as inter-mill management.

Procurement organization – For the purpose of this study the procurement organization is responsible for purchase of raw material to satisfy wood needs of the consuming mill. Raw material may be purchased as previously harvested (gate wood) products or standing timber that has not been harvested.

Strategic planning – Long range planning that helps a company obtain long-term goals. Strategic planning can encompass three to five years or more.

Operational planning – Intermediate level planning that breaks strategic plans into smaller time periods. Operational planning usually focuses on 1 year or less.

Tactical planning – Short term planning that implements operational plan. Tactical plans impact the day-to-day operation of a firm.

Planning gap – The difference between where a company would like to be and where it is likely to be in the future if it does not change.

Harvest block – An area that is delineated for harvest. Harvest blocks can have all timber or a defined portion removed.

Just in Time inventory – A current inventory management strategy that allows the consumer to maintain minimal inventory by having the necessary components arrive immediately prior to their need in the manufacturing process.

## *Chapter 1*

### INTRODUCTION

#### **1. Introduction**

The goal of any commercial enterprise (business) is to make money. From management of mill operations to procurement of standing timber and logging force coordination, planning has the ability to reduce cost, increase productivity and eliminate the negative effects that unforeseen obstacles may cause. Planning impacts all parties involved in the wood supply system and helps identify a course of action to take in the present to ensure that the organization obtains its goals in the future. The course of action to be followed is determined through identifying obstacles and then eliminating (or reducing) the impact that those obstacles may have on the ability to reach future goals.

Placing a value on planning is often difficult. For planning to be successful, impacts of obstacles must be minimized. As efficiency decreases cost increase. Increased cost is a result of reduced productivity, which increases per unit production cost. While some believe the financial investment in planning is not recaptured in monetary value others believe the cost of poor (or no) planning is much greater.

Planning is a series of steps that are carried out at different times to reflect goals of the operation. After the plan has been implemented, constant monitoring is needed to ensure that correct implementation is being carried out. The plan may need to be altered to ensure that the goal is met.

Due to the dynamic nature of many of the parameters in the forest industry planning becomes more difficult. Parameters that affect production in the forest industry include tree size, trees per acre, skid distance, number of product sorts, transportation distance, etc. Unlike other industries that work in a static environment (a factory for example) each harvest area in the forest industry has different characteristics. In static industries, day-to-day conditions do not

vary as much as in the forest industry. In the forest industry the work site is constantly changing. A particular harvest block can change to reflect, for example, differences in weather, stand composition, and terrain.

Planning becomes even more important because of the amount of time required to complete a rotation in the forest. Unlike industries that establish and harvest crops annually, the forest industry can incur in excess of 30 years from establishment to final harvest. The harvesting phase of a 30-year-old stand, for example, can encompass less than 1% of the rotation time. However harvesting has the greatest impact on the residual site and the amount of revenue generated per acre than any other activity.

The southeastern forest industry is represented by the states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia (Johnson, 2001). In 1996 the forest industry in the southeast produced 9.6 million cubic feet of timber product output. This volume was harvested from nonindustrial private forestlands (65%), forest industry land (29%) and public land (6%). Softwood species (loblolly, shortleaf, longleaf, and slash pines) composed 64% of the volume. Hardwood species (red oak, white oak, sweetgum, yellow poplar, and hickory) composed 36% of the volume. The forest industry in the region produced 3.7 billion cubic feet of sawlogs, which was 50% of the national sawlog supply for that year. Product breakdown for the volume was sawlogs (38%), veneer logs (9%), fuel wood (10%), pulpwood (41%), with composites and other products making up the remaining 2%.

Forest products companies in the southern region, like other regions, of the United States over the past decade, have faced consolidation. Decreased demand levels for raw material and finished wood products combined with an overcapacity in logging have had direct impacts on the industry. Labor in the area is difficult to attract and even more difficult to retain. Rising prices of new equipment and devaluation of used equipment have also added to the woes of the forest industry in the region.

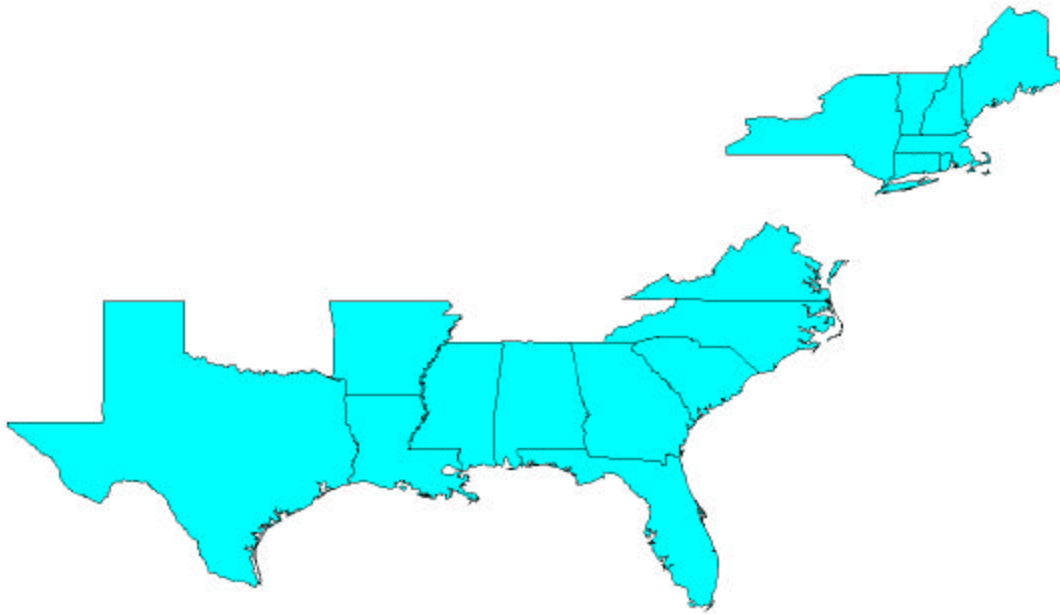
Planning in this region takes on many forms. For loggers who purchase their own timber, planning encompasses all portions of the operation from equipment purchases to marketing of

products. For loggers who contract with a single consumer, planning may focus more on specialization of the operation to fulfill customer needs and profit generation through increased number of annual working days. From wood flow coordination to skid trail construction, planning (or the lack thereof) impacts the manner in which each process is carried out and the overall efficiency of the system.

For consumers, planning focuses more on supply levels and allocation of resources. Providing well-planned harvesting and transportation systems are ways that consumers in the region are able to maintain quality loggers. Consumers, in order to be efficient, must plan wood flows and volume requirements. Without such planning, control over costs and inventory are virtually impossible. While the system may operate, gains in efficiency can be realized through proper planning. Producers in the area must plan equipment purchases, specialization, labor recruitment, working days, and production in order to maintain competitiveness.

During the summer of 2001 researchers from Virginia Tech's Industrial Forestry Operations Group, in cooperation with the Wood Supply Research Institute, collected information to determine the level of planning and communication present in the forest industry. Loggers, consumers, and wood dealers from the southeast and northeast regions of the United States volunteered information about their operations and the level of planning and communication currently present in their operations. In all, 169 interviews were performed representing the states of Maine, New York, Virginia, North Carolina, South Carolina, Georgia, Florida, Mississippi, Alabama, Louisiana, Texas and Arkansas. Figure 1 depicts the WSRI study area. Table 1 identifies the frequency of interviews by state and by interview type.

Figure 1. WSRI Study Area



| <u>State</u>          | <u>Logger</u> | <u>Dealer</u> | <u>Consumer</u> | <u>Total</u> |
|-----------------------|---------------|---------------|-----------------|--------------|
| <b>Maine</b>          | 8             | 0             | 5               | 13           |
| <b>New York</b>       | 2             | 0             | 2               | 4            |
| <b>Virginia</b>       | 7             | 0             | 3               | 10           |
| <b>North Carolina</b> | 9             | 6             | 4               | 19           |
| <b>South Carolina</b> | 7             | 6             | 2               | 15           |
| <b>Texas</b>          | 19            | 1             | 5               | 25           |
| <b>Florida</b>        | 2             | 1             | 0               | 3            |
| <b>Alabama</b>        | 13            | 3             | 3               | 19           |
| <b>Mississippi</b>    | 6             | 5             | 4               | 15           |
| <b>Georgia</b>        | 9             | 2             | 7               | 18           |
| <b>Louisiana</b>      | 7             | 2             | 0               | 9            |
| <b>Arkansas</b>       | 15            | 2             | 2               | 19           |
| <b>Total</b>          | <b>104</b>    | <b>28</b>     | <b>37</b>       | <b>169</b>   |

Table 1. Distribution of WSRI project interviews

### **1.1 Study timing**

The timing of this study reflects a depressed period in the forest industry. During the summer of 2001, the forest industry was marked by reduced mill consumption, poor market conditions, large inventories of purchased stumpage reflecting past (inflated) prices, and removal of consumption from the market. Consumers were trying to decrease cost while logging contractors were dealing with unusually high fuel and increasing consumable prices. These factors influenced the attitude and responses from our participants.

Conclusions were based on both data collected and information obtained through discussions with cooperators. Some of the findings reported here were not directly surveyed in the interview process but became evident through the debriefing process, which all the researchers participated in.

### **1.2 Study objectives**

The goal of the study was to (1) determine the level of planning and communication present in the forest industry and (2) provide a decision framework for planning and communication in the forest industry. The project identified the types of information most commonly passed between parties involved in the system and how the information is used in planning activities.

### **1.3 Work plan synopsis**

1. Identify issues common to the supply side and consuming side of the wood industry related to planning and communication issues.
2. Identify additional opportunities associated with planning and communication issues.
3. Gather information related to the current status of planning and communication in the forest industry.
4. Analyze information for trends and areas of possible improvement of planning and communication
5. Assemble matrix of opportunities and outcomes from data gathered.

## *Chapter 2*

### LITERATURE REVIEW

#### **2. Literature review**

According to Reinhart et al. (1981) planning is “management’s attempt to anticipate future changes”. Planning is a process of using currently known information to prepare for future occurrences by setting objectives, gathering and organizing information, and determining actions to be taken. Planning encompasses all levels of an organization and in many cases determines profitability.

For most operations, planning is a very small portion of the overall supply chain cost but impacts both products and processes. The goal of any planning process is to identify a course of action to take in the present to allow the organization to obtain future goals. Planning is the process of making and carrying out plans, or attempting to anticipate future occurrences in the present. The planning process uses information to set objectives and make decisions about the future. The process requires information to be gathered and organized so that appropriate actions can be identified and implemented. The process, scope and resolution of planning differ among organizations and even among different levels in an organization (Reinhart et al. 1981).

The goal of planning is to match the organization with the environment in which it exists (Reinhart et al. 1981). The planning process includes stages such as goal setting, collection and analysis of information, strategy formulation, and implementation (Reinhart et al. 1981). A plan should be dynamic, adapting to changes in the internal and external environment. Implementation of a plan should always involve follow up, feedback, and control. As reality about the operating environment changes the planning process must be revised to ensure that the plan focuses on the necessary areas (Reinhart et al. 1981).

Proper planning gives both the logging contractor and the land manager the ability to evaluate activities prior to implementation. Improper planning reduces the amount of time available for interaction and increases the likelihood that obstacles to efficiency will arise after operations have begun. Rising timber values and increasing use of Just in Time inventories magnify the need for better planning and implementation.

## **2.1 Reasons for planning**

While land uses may have different values, the main focus of commercial forestry operations is to generate a profit for its shareholders using available resources. Plantation life cycles can range from 12 – 80+ years depending on species and stand characteristics. The actual function of harvesting can take as little as two weeks (less than 1% of the total life cycle of the plantation), and has as much influence on the end value of the resource as the growth cycle itself. Harvesting also has a major impact on the residual site and can greatly impact the productivity of future rotations.

Proper planning can produce monetary savings in the cost of transportation and can reduce the total amount of time necessary to complete the harvesting function. Planning increases the likelihood that obstacles will be identified and their negative affects will be minimized or eliminated all together.

Most woodland owners lack clear objectives even though they agree that clear objectives are necessary to properly manage and operate woodlands (McEvoy, 1998). Well-stated objectives describe the purpose of the forest ownership by framing the owner's interest within the context of forest's capabilities.

## **2.2 Levels of planning**

There are three recognized levels of planning. Each of the three levels, (strategic, tactical, and operational), relate to different time frames and aspects of an organization. In theory, each level of planning helps guide the organization toward its future goals and ensures that all of a company's resources are being employed to make money. All levels of planning should therefore be integrated to ensure that goals are accomplished. MacDonald (1991) determined in a survey of forest management companies in Canada that planning processes seemed

primarily designed to satisfy requirements of forest management agreements and that integration of the three recognized levels of planning was not being done.

### 2.2.1 Strategic Planning

Planning at the strategic level should answer the “what, where and when” questions (Larsson, 1984). The difference between where a company would like to be and where it is likely to be in the future if it does not change is called the “planning gap”. The exact length of the planning gap varies generally by industry and specifically by company. Strategic planning is primarily concerned with closing that gap (Reinhart et al. 1981).

Steiner (1979) defined strategic planning from four points of view: futurity, process, philosophy, and structure. Futurity is the chain of cause and effect consequences that develop over time as a result of a decision. Process refers to setting objectives, devising strategies and creating policies for an organization. Philosophy is a thought process rather than a prescribed set of procedures, structures or techniques. Structure is establishment of company objectives, policies, strategies and implementation plans for the short-term and long-term.

The ultimate point of performing strategic planning was to benefit the organization (Steiner, 1979). Strategic planning does not attempt to make decisions, but rather guide the manner in which they are made. If the benefits of planning do not outweigh the cost incurred during the planning process (or the implementation phase) the exercise may have little or no benefit to the organization.

Strategic planning is an attempt to plan the future on paper and deals with the interrelationship of the individual parts of an organization. A strategic plan focuses on the long-term goals of an organization and is concerned with relating the organization to the environment. Strategic planning offers a basis for preparing a comprehensive system of plans and can reach into the future 5 years or more. The exact length of time horizon varies by industry and company.

Strategic planning should be carried out by knowledgeable individuals using as accurate information as possible (Aulerich, 1999). “Strategic planners should be well versed in all

aspects of systems and equipment and should be trained to utilize the information and resources available.”

Strategic level planning generally deals with large geographic areas while other levels of planning may relate to smaller geographic regions. In many cases strategic planning is the most challenging to carry out because the planner needs to think in terms of the future. Obtaining agreement between multiple departments, on the future path of the organization can be challenging at best. It may also be found that the environment that was planned for is different from the one that evolved. Long term wood supply needs, sustainable cutting rates, a logging contractor’s decision to replace a depreciated piece of equipment, and strategic road layout are all examples of strategic planning. Obviously the confidence in any strategic plan can only be as good as the assumption or the information that is used to generate the plan.

Examples of different methods of strategic planning include Aulerich, Navon, and ISO 14000. Aulerich (1999) believed that strategic harvest and transportation planning could be used to meet future physical, environmental, social, and economic goals in the forest. This form of planning could be used to determine how large areas (500 – 10,000 acres) were accessed and harvested and what systems should be used. Aulerich (1999) further believed that “one of the most powerful aspects of strategic planning is the ability to adapt to market opportunities” and that strategic planning had the ability to minimize the impacts and risks to water quality by minimizing soil disturbance.

Navon (1975) used “Roading Timber Resource Allocation Method” to determine road placement and construction in the strategic process. This system took user defined variables into account to determine road placement.

Another form of strategic planning, ISO 14000, was developed by the International Standards Organization to “promote achievement of environmental goals commensurate with the nature and scale of the activities”. ISO 14000 requires documentation and implementation procedures as well as monitoring and review to ensure that procedures are working correctly.

### 2.2.2 Tactical Planning

Tactical planning is used to integrate the internal activities of the organization, and is considered an intermediate stage between strategic and operational planning. Tactical planning is concerned with the allocation and uses of resources.

Tactical planning provides input for compiling annual budgets, and ensuring that financial requirements are met in the coming year. Tactical planners translate the paper plans created in the strategic phase into medium range plans that serve as guidelines for the short-term operations of the organization. Tactical planning has control over areas such as products, research, utilization of equipment, and personnel. The type of products and amounts to produce, development by research and development of product ideas, and levels of labor necessary to accomplish those goals are all aspects of tactical planning. Tactical planning efforts are generally focused on a time span of less than 12 months.

Tactical planning in the forest industry can be broken down into different components as they relate to an organization and include scheduling, allocation, and layout. Scheduling can be described as organizing resources so that wood flow targets are met (Galbraith and O'Reilly, 1984). Scheduling refers to the sequence and timing of operations such as road building and harvest scheduling. Scheduling can be explained in terms of adjacency or spatial requirements for forest companies who manage large tracts of timber that are harvested in annual increments.

Allocation takes scheduled tasks and assigns them to an entity for completion. In the forest industry, allocation could be described as assigning wood flow to producers or tasks to members of the organization. Assignment of tracts to loggers, tonnage goals to procurement divisions, and wood requirements to wood yard managers are all examples of allocation procedures.

Layout can refer to road or tract layout in the forest industry. The purpose of performing layout is to maximize the value of the investment while minimizing the cost. Layout is determined by the landscape, capacity for the machinery to operate, and available markets (Robak, 1996). Layout also minimizes the adverse affects of environmental impacts.

Operational and tactical planning for harvesting should be integrated so that an overall harvest plan could be developed (Clark et.al., 1997). For example integration could benefit in location of access corridors since more than one harvest block would use the same access road. Determination of the most economical landing and road location could also be performed if the two planning horizons were integrated. Integration at this level may give managers the flexibility to manipulate harvest plans to maintain minimum harvest costs.

### 2.2.3 Operational Planning

The most commonly recognized level of planning is operational. Operational planning relates to the day-to-day functions of the operation and is more detailed than the other levels of planning due primarily to the increased availability of information. Operational plans are generally developed for, and only valid for, a fixed period of time and are used to implement portions of strategic and tactical plans.

Examples of operational planning might include quota enforcement at local mills, tract layout and harvest planning for procurement organizations, and harvesting strategy for a particular stand by the logging contractor.

While the immediate goal of operational planning is to implement the steps of the tactical plan, other benefits of this level of planning exist. Examples of benefits of operational planning include minimization of road construction cost resulting from proper layout techniques, maximum return on capital invested in road construction by serving the highest number of acres, increased efficiency of harvesting operations resulting from properly matching the harvest systems to the characteristics of the harvest block. The list of potential benefits depends on the scope of the operation being planned for and the detail in which the plan is designed and implemented.

Planning the layout of a logging unit is key to abiding by Best Management Practices while maintaining acceptable productivity levels for the system employed (Shaffer and Meade, 1996). Harvest unit planning describes planning for individual harvest units. In the operational stage volumes, soil types, and stand characteristics are used to prepare a detailed harvest plan for

presentation to the producer. Layouts determined during tactical planning must adapt to suit the unit (Conway, 1982).

Productivity and efficiency of any harvest operation is directly related to stand layout. Short term scheduling breaks down tactical planning related to wood flow into smaller segments. The object of short term scheduling and allocation is to ensure that the goals of the consuming segment are met while allowing the producing segment to run at optimal levels of production and efficiency. Transportation systems should be developed based on their operating environment (Larsson, 1984). This operating environment determines what, when, and where production will be delivered.

### **2.3 Planning tools**

With the continual improvement and cost effectiveness of technology, and increasing use of Geographic Information Systems (GIS), more interactive tools are becoming available for use in planning activities. Most currently available tools reduce the amount of work required in the office and in the field. While these tools offer time saving advantages, results must still be field verified to ensure that the information is correct and the corresponding decision reflects reality.

GIS tools have been developed to aid in the planning of roads, harvest areas, drainages, etc. Roger's et.al. describes a tool that utilizes a digital quadrangle map in a GIS to calculate road grades and layout options. Users determine the beginning and ending point of a proposed road by selecting nodes. The application will determine the best road location based on parameters defined by the user. Field verification will be necessary, but the amount of time spent manually locating a road and determining grade on a topographic map will be greatly reduced.

The Planex system (Epstein et. al., 2001) uses GIS, topological information and timber volumes to determine location of yarding equipment, the area that can be harvested from a particular yarder landing, and what unreachable areas exist for a particular yarder set (location).

Preliminary Logging Analysis System is a planning tool that has been developed for use at the strategic level and uses Digital Terrain Models (DTM) to analyze an area for cable yarding

applications. PLANS can be used on land bases from 5,000 acres to 50,000 acres. Aside from the primary use of planning for cable logging operations the program can generate visual impact scenarios resulting from the harvest of a particular area. An additional benefit of PLANS is that it can use parameters such as road density, yarding distance, acreage, and piece size to create long range (strategic) plans for an area.

Terrain Tools is a set of computer tools to assist forest engineers with short range planning (Byng, D.A. et al). The program allows the use of both survey and map information to generate a Digital Terrain Model (DTM). The model is generated through a Triangular Irregular Network (TIN). Using a TIN ensures that known elevations will be used instead of calculated values from surrounding cells. The software allows the user to generate contours, create profiles, and perform visibility tests of an area based on a user defined sight line. Another benefit of this application is the ability to perform road layout in which changes can be represented quickly on the DTM which allows the planner to model different layouts quickly and efficiently.

Navon (1975) used mathematical modeling techniques to solve short-run planning problems related to maximum efficiency of the transportation system employed. This planning system was developed by the United States Forest Service to account for truck transportation of independently routed loaded and empty trucks. The application allows the user to build or close road segments, specify which road segments to use, and allows the user to generate routes between a harvest site to different mills.

## Chapter 3

### METHODS

Figure 2 shows the major steps that were taken to complete this project with parallel steps being performed simultaneously.

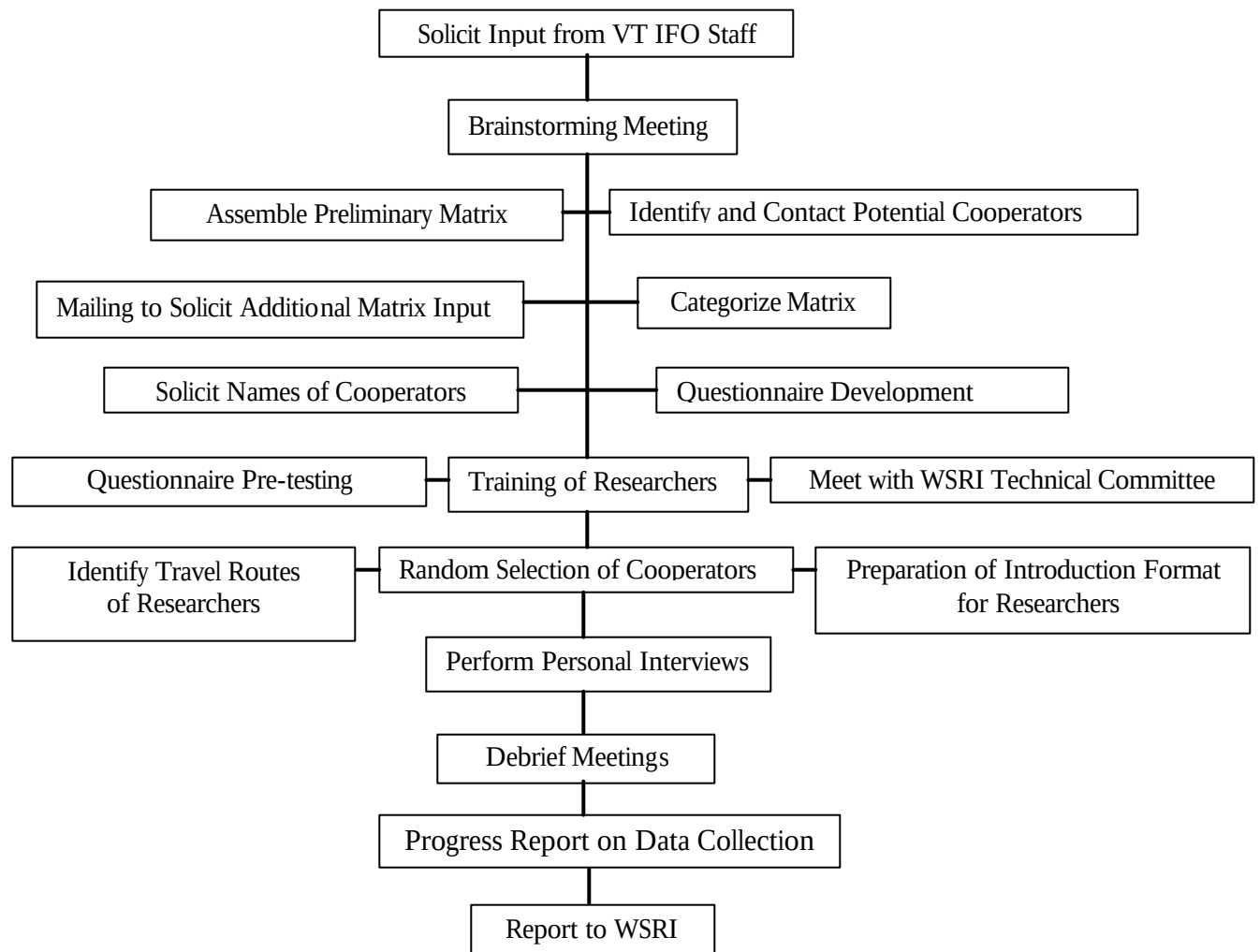


Figure 2. Activities performed during Planning and Communication Project

### 3. Methodology

The following are the methods undertaken to guide the project from beginning to end. The steps described represent approximately one year from start to finish. Members of different

organizations such as Virginia Tech, Georgia Pacific, Westvaco, and International Paper took part in these steps providing valuable information to the investigators.

### **3.1 Solicit input from Virginia Tech Industrial Forest Operation staff**

At the start of the project base information about planning in the forest industry was gathered from the faculty and staff of Virginia Polytechnic Institute and State University. Each member of this group was asked to provide key concepts related to planning and communication in the forest industry. These lists were gathered and analyzed, and a list of key planning opportunities was produced. The list was the starting point for identification of issues and opportunities associated with planning and communication. As additional information was gathered the list was updated.

### **3.2 Brainstorming meeting**

A brainstorming meeting of seven industry professionals with extensive experience in planning and communication in the forest industry took place in Blacksburg. This meeting served a two-fold purpose; (a) the meeting gathered insight to the current status of planning and communication systems, (b) what currently needed to be done to improve planning and communication systems in the forest industry.

### **3.3 Assemble preliminary matrix**

Using information gathered from faculty and staff of Virginia Tech and from experts in the industry, a preliminary matrix of key planning opportunities was generated. The matrix identified key planning opportunities and how the opportunity affects each party in the wood supply system. The initial broad breakdown of parties was suppliers and consumers. A third category was added later to reflect the influence of wood dealerships on the forest industry.

### **3.4 Mailing to solicit additional matrix input**

After members of the Virginia Tech faculty and staff generated a list of key issues, a group of 20 industry professionals was contacted. These professionals have responsibility for planning and communication in their respective organizations. Each of these individuals received a list

of the key issues that had been identified. The individual was asked to evaluate the issues identified and provide comment.

Each individual was also asked to submit two additional issues that should be included in the data collection process. In order to assure that all mailings were responded to, each individual that had not responded within a given period of time were contacted by phone. This contact allowed researchers to answer any questions that had arisen and ask that responses be returned by the deadline. If after another week no response was received a final attempt to contact the individual was made to obtain the necessary information while on the phone.

### **3.5 Categorize matrix**

The responses of the mailing were categorized and incorporated into the planning matrix, where possible. Each planning opportunity was categorized by its affect on both the consumer and the producer (and the level where the impact was recognized Strategic, Tactical, Operational) and then used as a basis for questionnaire development.

### **3.6 Solicit names of cooperators**

While replies from mailings were being received and the assembly of the draft matrix was being attempted, additional contact information was being gathered for the proposed study area. The New England area was addressed after the decision has been made by WSRI. For the remainder of the study area additional contacts were made through:

1. Contact of industry executives.
2. Networking of current contact with individuals currently cooperating with Virginia Tech's IFO faculty
3. Assistance from WSRI technical committee members and cooperating organizations.
4. Obtaining cooperator information for previous WSRI studies.
5. Obtaining membership lists from various state and local logging and forestry associations.

As contacts were made and cooperation secured a basic travel plan took shape. The study area was broken into separate areas based on regional differences and level of cooperation. After the study area had been divided, each portion was assigned to a specific researcher who was

then responsible for using contact information to establish a schedule and travel route for that region.

### **3.7 Questionnaire development**

Using all available information gathered in the previous steps, questionnaires for each party (supplier, consumer, and wood dealer) in the wood supply system were developed. The questionnaires were designed to take less than one hour to complete while still gathering the information that was desired. Originally two questionnaires were developed to identify key opportunities and gather information to address current issues. One questionnaire focused on the consuming (mill) segment while the other focused on the supply (logging) segment. It was later decided based on the differences between different areas in the wood supply system that an additional questionnaire focusing on the wood dealer segment was warranted.

### **3.8 Questionnaire pre-testing**

The interview process, like all other processes, involved a learning phase. It was expected; initial interviews would take longer than ones performed after knowledge of the format had been gained. For this reason the questionnaires were tested on local cooperators prior to full data collection efforts. This pre-testing phase allowed researchers to gather feedback about the format of the questionnaire and the length of time that it took to perform an interview. Each questionnaire was tested with 3 individuals prior to beginning full data collection. This pretest was performed prior to the July meeting with the WSRI Technical team to allow adequate time for changes to be made. Individuals who were interviewed during the testing phase were asked to provide feedback about the format of the questions and the information that was being sought. The amount of time necessary to complete the interview and additional comments (about areas that were not covered) was recorded.

### **3.9 Training of Researchers**

Prior to beginning the full data collection phases each researcher was trained on the interview process. The main purpose of the training was to ensure that all data collected was of similar format and that all questions asked were attempting to reach the same answers. Each researcher performed at least one full interview with another researcher with experience with the format of the questionnaire and the interview process. The trainer acted as an observer and

fielded any questions that arose from the researcher or the cooperator. The trainer guided the process and indicated areas where the trainee needed to place special emphasis. For each researcher this was done a few weeks in advance to allow for questions to be answered and changes to be made.

### **3.10 Meet with sponsoring organization**

As part of the contract agreement between WSRI and Virginia Tech, a meeting with the WSRI Technical Team took place prior to the onset of full data collection efforts. The meeting took place in early July. During this meeting questionnaires were presented to WSRI for evaluation and input. The technical team reviewed the questionnaires and provided input that was incorporated into the questionnaires

### **3.11 Random selection of cooperators**

Individuals interviewed were determined by selecting cooperators from contacts compiled. A total of 150 interviews were sought (this goal was exceeded by 19). Proposed interviews included 100 logging contractors (suppliers) and 50 industry personnel (consumers). No constraints were placed on loggers or consumers (size, type, production, consumption, etc.). Based on the study area, 15 interviews per state were thought to be sufficient to meet the goal.

### **3.12 Identify “travel routes” for researchers**

Data collection will began in mid July 2001, and was complete in mid August. The researcher responsible for each region determined the travel route for that region. Routes were based on the number of cooperators available, the amount of time that the researcher had to dedicate to an area, and the total number of interviews necessary. Every attempt was be made to eliminate duplication of areas. It was recognized however, that many consuming organizations were very localized in their operations and that overlap could still happen.

### **3.13 Prepare introduction format for researchers**

Since many of the individuals to be interviewed were unfamiliar with the project (and WSRI), an introduction script was created to answer the most frequently asked questions. The script informed the cooperator:

- a. What the purpose of WSRI was.
- b. Who participates in WSRI?
- c. What the goal of the project was.
- d. Who would see information provided in the interviews?
- e. What the information would be used for.
- f. How the researcher was related to WSRI.

### **3.14 Perform personal interviews**

In order to gather the information that was sought, on-site interviews with logging contractors and members of the consuming segment were performed. The decision to use on-site interviews was two fold. First, on site interviews allowed the interviewer and cooperator the ability to candidly discuss current trends and issues in the forest industry. Second, the interview process allowed the researcher to gather the maximum amount of information from the cooperator in the shortest amount of time.

Each interview was performed in a manner that reduced the negative impacts of cooperation. Loggers were interviewed at the logging site when possible and members of consuming organizations were interviewed in a location local to their area of operation. Since many consuming employees were providing access to logging operations for interviews it was possible to interview these individuals while traveling between interviews with logging contractors. Cooperators were not asked to “fill out” or submit any additional information, thereby reducing the amount of impact that the data collection process had on the cooperator.

While the interview process was time consuming every effort was made to focus on data quality over data volume. Since time constraints limited the researcher to one interaction with each cooperator every effort was made to gather all necessary information at the initial meeting. Each researcher was asked to record thoughts and observations related to every interview. The information was then used in the debriefing process to refresh the researcher's memory about the interview. This information along with the data sheets was also used to form area-based assumptions.

### **3.15 Debrief meetings**

After data collection was complete the data manager met with each researcher responsible for data collection for a debrief meeting. This meeting allowed the researcher and the data manager the opportunity to discuss interviews performed. The content of these meetings included:

1. Discussion of each questionnaire.
2. Information recorded on data forms and commonality of recording methods.
3. Clarification, between the researcher and data manager, concerning how a response was recorded and the intent of the response.
4. Discussion of notes taken during the interviews.
5. Discussion of regional (area) practice that may have surfaced during the interview process.

The researcher then provided the lead researcher with all data forms and notes discussed in the meeting. The lead researcher entered this information into a spreadsheet.

### **3.16 Data analysis**

After all data had been collected it was compiled and entered into a spreadsheet for data analysis. A spreadsheet for each type set of questionnaires was developed. Due to the variability of the data many statistical processes were not applicable (each person interviewed was different enough to limit the amount of comparison possible). Therefore data analysis was limited to basic statistical methods that groups similar operations together.

After data had been collected and compiled a meeting with the WSRI technical team took place to update members on the progress of the project. The meeting allowed researchers the opportunity to provide preliminary results of the data collection and gather input from WSRI concerning report format and content.

## *Chapter 4*

### RESULTS

#### **4. Results**

Following are results obtained from data gathered during the interview process. This section presents the results that were felt to be most pertinent to this study. All questionnaires and graphically presented results from those questionnaires are presented in the appendices.

#### **4.1 Critical review**

After all data had been collected and evaluated a critical review was performed. The purpose of the critical review was to determine the current state of planning and communication present in the industry and to identify trends. Much of the information presented in the critical review focuses on the consuming segment of the industry. It is not the goal of this report to blame the consuming segment (or any other segment) for the current status of planning and communication in the industry. It is believed that many of the opportunities that exist for improving planning and communication rest with the consuming segment and are therefore presented in terms of the consuming segment of the industry.

Many of the changes that are needed require the consuming segment to redefine its practices and would not require a large capital investment. In many cases the most needed change is better communication between the different segments. Many of the benefits that the supply side will receive will not be at the expense of the consuming segment. In fact as the supply side benefits so does the consuming side through increased control over volumes, inventories, and associated cost, thereby creating a win-win opportunity.

#### **4.2 The 'Industry'**

The average amount of wood flow managed by personnel (typically procurement personnel) for the companies that were interviewed was 140,000 tons per year with a range from 12,000 to 800,000 tons. Seventy percent of the mills interviewed received less than 50% of their raw

material from company lands. Dealers interviewed supplied between 62,500 and 1.3 million tons per year and typically worked with a 3-month planning horizon. Both large and small logging operations were interviewed. The largest produced approximately 405,000 tons and the smallest approximately 4,750 tons annually. The average logger interviewed produced 65,000 tons per year, had approximately \$1.3 million of capital invested in their inwoods operation (based on new equipment prices), with an additional \$250,000 invested in their truck fleet.

The critical review is organized according to the five areas of inefficiency (and possible improvement) that were identified during the data analysis. The five areas identified were wood flow planning, tract, allocation, communication, production monitoring and rate setting, and transportation system coordination. Each area has a different impact in terms of cost and benefit on different portions of the wood supply system.

#### **4.3 Wood flow planning**

Demand and supply are the two driving factors for production and consumption. As consuming organizations continue to shift to Just-in-Time (JIT) inventories, the impacts of changes in supply and demand are magnified. Over half of the consumers interviewed received less than 2 weeks of lead-time before the mill changes its product mix. Almost 35% of the consumers interviewed stated that consumption mix changes as frequently as once a week.

Less than 50% of timber purchased by consumers now comes from company owned land. With short lead times between demand changes and the lack of controlled stumpage, consumers' control of wood is limited to purchased standing timber or gate deliveries. Having little or no control over some percentage of the annual wood demand lessens the ability of the procurement organization to respond to short-term fluctuations. This also increases the likelihood that consumers will pay premium rates in times of high demand.

Of the consumers interviewed 76% have less than 2 weeks inventory at their mill and 50% have no offsite storage capacity. Reduced onsite inventory and offsite surge capacity compounds the likelihood of price swings in purchases. Only half of consumers set production targets for loggers, and without a planned purchase strategy logger quotas are used to limit deliveries.

Thirty-seven percent of the loggers interviewed said that they received poor or bad information on expected demand, yet 91% of loggers surveyed were contract loggers to a single consumer. Suppliers compete for consumption volumes at mills, while the consumer has no guarantee that the supply will continue. If the supplier finds a higher paying market the consumer will be forced to react and replace the lost production with that of another supplier. The supplier on the other hand is forced to accept 'prevailing market' prices and has little knowledge of how long the market will continue. If the consumer can replace his volume with a lower cost market the supplier will have to find a new outlet for his production. To illustrate this point, 67% of loggers identified themselves as 'Core Suppliers' yet 70% of loggers stated that the companies were 'somewhat' or 'not helpful' in setting production goals.

#### **4.4 Tract allocation**

During the interview process, allocation procedures were one of the most discussed issues. Seventy-one percent of consumer employees provide loggers with less than 1 weeks advance notice for moving to the next tract. This information includes location, volumes and markets. Short lead times of this nature reduce the ability of the logger to plan in terms of capital expenditures and resource allocation. It also reduces the consumers' ability to coordinate purchase volumes with inventory levels.

Many of the loggers interviewed worked directly with a consumer or wood dealer. In fact less than 25% of loggers interviewed bought a high percentage (more than 25%) of their annual timber harvest from the open market, thereby allying themselves with consumers. The arrangement provided loggers with a 'home' for their production. In some cases the loggers were obligated to supply only to that consuming entity while others were allowed to haul secondary products to locations other than those controlled by the company. Of the dealers that were interviewed, 89% provide one week or less of lead-time to the logger even though a third of the dealers interviewed receive 1–4 weeks worth of lead-time from the consumer that they work with. Eighty-one percent of consumer employees give their loggers one tract at a time and 92% of dealers interviewed allocate tracts one at a time. Forty-five percent of loggers that were interviewed felt that they did not receive enough advanced notice of their new tracts to adequately plan.

One impact of poor planning (or lack thereof) is mismatch of loggers to tracts. Obviously not all tracts can be matched to a specialized producer. However, 43% of consumers interviewed estimate that the harvesting system chosen for a tract was not well suited for that tract at least 10% of the time. This inefficiency carries with it additional cost that must be absorbed by the logging contractor or compensated for by the consuming organization. This increases the overall cost of production. The majority of loggers interviewed felt that additional tracts (in the form of packages) would improve their ability to plan each tract and maintain productivity. In many cases, the consuming employee knew the particulars of the tract, but would not reveal them until immediately before moving to the tract. Sixty-eight percent of loggers interviewed state that a minimum of 3 months worth of tracts is necessary to allow for adequate planning.

Of the loggers interviewed, 48% did not think that companies understand the effect of lost production on the profitability of their operation. Although not always documented during the interviews, during debriefing meetings with researchers, it became evident that well over half of the loggers surveyed believed that the consumer 'did not care' how the consumer's actions affected the profitability of the logger's operation. The average logger interviewed planned on working 49 weeks, yet loggers end up working, on average, three weeks a year less than planned. Each day lost increases the overall cost.

#### **4.5 Communication**

Exchange of important information is one manner to increase the ability of all parties to plan. Loggers' benefit by having more knowledge of what is expected while consumers are better able to predict wood flows. Improved technology has increased the amount of communication but has made it easier to react to obstacles rather than plan for them. Of the loggers interviewed only 21% felt they received enough information to plan their operations. When asked what could be done to improve the system, loggers (25%) said that they would like more information on the future supply needs of the mill, and to be more informed about possible quotas and shutdowns.

The frequency of communication between companies or dealers and loggers seems very high. Of loggers and consumer interviewed more than 60% communicate at least twice a week.

Most of the communication is carried out by telephone with very little being done in written form. Employees of consuming organization (25%) felt that improved communication within their own organizations, as well as being allowed to procure or plan more timber in advance, would help them provide a greater lead-time for the loggers.

#### **4.6 Production monitoring and rate setting**

Half of the loggers interviewed have more than \$1 million dollars invested in their in-woods operation. Nearly 55% of the loggers interviewed get their logging rate set less than 1 week prior to starting a tract by consumers and 67% by dealers. Most loggers reported that they had an 'idea' of what the rate would be, based on previous tracts and their equipment spread, however few if any kept detailed records about terrain and stand characteristics and profit / loss levels. In the past loggers who showed loyalty to a consumer had the loyalty rewarded by consistent work and predictable cash flows. Even companies with preferred supplier systems are taking bids from outside the organization (including the Internet) for wood orders.

Many producers believe that the reason there are few if any young people starting up logging businesses is that they have no way to show loan repayment. Most established loggers are still able to obtain financing because they have a proven record of past repayment or a relationship with the lender. Of the loggers interviewed 43% know where they will be selling their timber less than one month in advance.

Currently, the industry does not focus on efficiency; the survey indicated that fewer than 35% of management and 25% of loggers had a good grasp of production efficiency variables.

#### **4.7 Transportation systems coordination**

The median logger interviewed harvested about 65,000 tons per year with 75% of loggers providing some of their own trucking. Sixty-two percent of loggers had over \$100,000 invested in trucking assets and 19% had \$500,000 or more invested in trucking assets. For most loggers compensation for transportation was incorporated into the logging rate for the corresponding tract. Since many loggers are allocated tracts one at a time, advance transportation planning with just a one week planning horizon is a challenging task. Without prior knowledge of volume to be moved and effective haul distance planning at best would be difficult. Twenty five percent of dealers interviewed thought that trucking was mismatched 40% of the time or

more. Over 25% of the mismatch recorded was attributed to excess variation in trucking distance and lack of adequate trucking supply.

Eighty three percent of the time someone other than the logger was responsible for determining the deliver point of production. Only Forty three percent of loggers interviewed knew where they were selling their timber at least one month in advance. Eighty six percent of the time markets were determined by availability, rather than economics.

#### **4.8 Anecdotal comments**

In addition to quantitative information obtained in the questionnaires, individuals interviewed were given the opportunity to provide opinions on where they thought the greatest improvement could be made. These comments are meant to shed light on the feelings and attitudes of the individual interviewed and should be viewed as such. Questions are grouped by questionnaire with each question being followed by a short list of responses that represent the sentiment of the cooperators interviewed. A short paragraph following the responses summarizes the sentiments of those interviewed.

##### 4.8.1 Logger Questionnaire

#### **For the mills that you supply, what additional information could they provide to improve your ability to plan?**

- More information on market changes, better communication related to how and where to go
- Location of next tract so that move could be planned
- Better knowledge (in advance ) of future tracts
- Production outlook – what does the company expect from the contractor in coming months
- What markets are available and how much can go to each
- Shutdown information, market swings, changes
- Better information on specs of the receiving mills of secondary products
- Better information transfer from upper management to lower levels (and then passed on to suppliers)

- Better information about size, number, and types of cuts that are expected of suppliers in the coming months

Most of the loggers interviewed said that information doesn't have to be especially detailed. Information such as the location of the next tract, anticipated changes, potential shutdowns, and information on specs will not increase the cost of the consumer. This same information has the potential to reduce the cost of the producer by allowing more efficient use of his time and resources. Providing this information also gives the logger the feeling that he is a part of a system (or team) rather than in competition with other suppliers for supply volume.

### **What does long term planning for logging business include?**

- Maintenance of current equipment
- Finding additional outlets for timber since timber companies do not have long term plan that they are willing to share with the logger
- Currently trying to sell operation – does not see future – too much competition from non compliant suppliers
- Sell or shut down
- Growth of business, add more equipment and employees
- At this point trying to survive – decisions are based on need
- Pass on to son in the future
- Focus on efficiency of the current business

Many of the loggers interviewed did not think long term. The responses recorded above indicate that loggers spend more time trying to determine methods to maintain cash flow without expending additional capital. Others are spending their planning time trying to diversify their current business or divest themselves of it completely. Those who do think long term are trying to identify ways to increase efficiency with current equipment. Very few of the loggers interviewed were investigating major changes or capital expenditures to improve their businesses.

### **How do actions of the consumer / mill impact your ability to plan for your operation?**

- Lack of timely information limits logger's ability to plan for his operation
- Lack of knowledge about the future limit the loggers desire to go out on a limb
- Lack of communication eliminates the ability to plan on both ends of the system
- Lack of communication and commitment on the mills part make planning for business difficult
- Consumers should give enough information to make a solid decision and give extra for specialization
- Most loggers are in break even mode and it cost consumers nothing to shutdown (or slow) a logger production because they have no investment in the system
- Employees of consuming organizations do not know what a specialized crew can be profitable in and therefore put specialized crews on the first available tract
- Not knowing is equivalent to not planning
- Pricing cannot overcome lost production and lack of guarantee prevent smart loggers from investing
- Conflicts between landowner and consumer are passed on to the logger (who ultimately bears the expense)
- What is the benefit of being a core supplier if you are going to be paid the same as everyone else and have to abide by the consumers rules
- Inconsistent information in many cases is worse than no information
- In current model production rates are too high and costs are too low generating an unrealistic rate

The above responses reinforce the disparity between the quality of information that consumers feel they provide and the quality of information that loggers feel they receive. This disparity further widens the communication gap between loggers and consumers. Without solid information provided in a timely manner loggers (and any other organization) have a very limited ability to plan and any planning that is performed directly reflects the quality of information that was used to determine the steps of the plan.

**What do you personally think could be done in terms of planning and communication to make your job easier?**

- More timber ahead, less worries about markets and future
- Additional inventory capacity to overcome mechanical delays or low quality stands
- Quit allowing disreputable suppliers to compete with reputable ones
- Put crews in timber that they can be profitable in
- Known production volumes, where work will be
- Honor commitments that have been made, help loggers attain a goal that has been mutually set
- Eliminate price fluctuations, loggers would rather have a cut and know what the rate would be for a long time
- Let loggers know when mill is going to be down or turn time is longer than normal prior to deliveries so that they can compensate
- Give loggers an annual goal, improve tract allocation procedures so that loggers are not continually passing each other on the way to work
- Quit moving loggers for reasons other than need
- Better planning on the part of the consumer that is then passed on to the loggers and suppliers that are affected

Consistency is the foundation of efficiency. Without consistent production most pricing methods that use average production are worthless since they used consistent production figures to determine the applicable cost. Accepting wood from disreputable suppliers erodes relationships that are built with quality suppliers. It is unfair to expect a producer to maintain higher standards than other producers for the same amount of compensation. Problems of this nature through time will lead to more disreputable suppliers because reputable suppliers will be unable to compete with suppliers who are cutting corners and thereby shaving costs. The consumer benefits in the short term through lower wood cost but in the end will spend more money attracting quality loggers or repairing the damage caused by disreputable ones.

4.8.2 Consumer Questionnaire

**What could be done to improve your current allocation system?**

- More tracts to cut
- More control over tracts you are moving on
- More communication between mill and procurement
- Allocation used as a reward to loggers who have been loyal in supply in the past
- Better information from the logger on when he will finish
- Mini packages for many of the suppliers
- More time between receiving tracts from land management and allocation to loggers
- Allow loggers to plan their own harvest scheduling
- More available stumpage so loggers have more confidence in having a future to cut
- More control over who gets to log the tract (poor loggers given the same opportunities as core suppliers)

More control over tracts by procurement organizations and increased logger involvement during the planning phase can reduce the amount of interaction required during emergency periods (weather, changes in consumption, etc) allowing procurement organizations to focus on other sources of wood and loggers to have smoother changes. Loggers need to recognize the benefit of bi-directional communication as it relates to the harvesting system. If both parties are provide information when it is available they have a better chance of eliminating or at least reducing the affects of obstacles. Limited control of timberland by procurement organizations has a direct impact on their ability to provide tract packages. With the increasing divestment of timberland by large corporations this is becoming and increasing problem.

### **Replies to why consumers don't set production targets for suppliers?**

- Set cost target and run what they can
- Its up to them because it is their business
- Arms length relationship – legal issues
- It is the nature of the business (but try to encourage)
- Because they are independent
- Harvest tracts not given to procurement with enough lead time
- Logger tries to get as much as possible – make tracts last as long as possible

Consumers do not set production goals for producers for a variety of reasons. For some, the expertise needed is not available. For others the amount of time required to determine targets and monitor them is not perceived as being a warranted use of time. For others the justification for not setting production targets is the desire to maintain arms length distance from the operation. The benefit of production targets is also misunderstood. Targets are goals not requirements. If a producer does not reach his goal on a given week he must attempt to exceed his goal the next week.

One method is to determine goals that allow the operation to be profitable at a production level less than the optimum. Using this technique the logger is profitable if he reaches his goal and even more profitable if he exceeds his goal. The benefit here is that in times of increased demand the logger has surge capacity available to produce more than his target thereby allowing him to make more money and the consumer to continue to purchase wood from his regular suppliers. If a particular tract is less productive than the target the logger can take the tract (and loose money in the short term) provided that the next tract will allow him to exceed the target for the same amount of time.

**What do you think could personally be done in terms of planning and communication to make your job easier?**

- Have more than 1 year of tracts to select from
- Better communication between mill and procurement – more notice from loggers when tract is ending and how wood is cutting out
- Better control over quota process between supplier and consumer – quit bunching up deliveries at the beginning of the week – dealers do not do a good job of distributing loads between loggers
- Earlier warnings of downtime from consumer
- Contract administration performed by another group to free up procurement to do their job
- More stumpage available, be able to communicate long term plans and commitments to logger so they will have confidence to plan long term

- More tract selection and lead time to lay out harvest schedule
- Improved information on mill needs, quality of budget, continue to improve communication between consumers and loggers
- More communication with immediate supervisor, more flexibility in position to trade, determine selection of tracts

Members of consuming organizations (procurement) have similar problems that producer have. Without knowledge of what is happening in the organization above them they have no basis for planning. Also without controlled stumpage the opportunities to provide packages to suppliers are limited to the amount of stumpage purchased. Allowing those responsible for dealing with producers more input and control of their portion of the system increases the ability for those individuals to solve problems. Without this level of input the individual is forced to delay the operation while a solution is determined. This delay calculates into additional cost for all involved. The logger loses production and corresponding cash flow while the consumer loses purchase volume and is forced to locate it from another source.

#### 4.8.3 Wood dealer Questionnaire

**For the mills you supply, what information could they provide to improve your ability to plan?**

- Inventory levels, consumption, pricing guidelines
- More advanced notice on mill shutdowns, more details on company policy changes
- Reduced variation in purchases from day to day
- Price that the consumer is willing to pay for a product prior to purchasing a tract, supply volumes that the consumer anticipates
- More long term planning information from the consumer – less knee jerk reaction
- Advance forecast with a minimum of 30 day projection
- More timely information on mill downtime, quotas, and price changes

Many of the responses that wood dealers provided mirrored those of the logging segment. Since wood dealers are an intermediary between loggers and consumers this seems to make

sense. Dealers like loggers must know the amount of volume (and specifications) that they will be allowed to deliver. Without this information dealers will be unwilling to purchase standing timber at risk. If additional outlets are available the dealer will be more likely to risk his own capital on standing timber. Not knowing what is expected of them limits the ability of a wood dealer to recruit loggers, including specialty crews, to perform the harvesting of timber that is bought or provided by consumers.

**How do actions of the consumer impact your ability to plan your operation?**

- Impacts decision on which tracts to cut and when to move on them – impacts profit and loss from a tract
- Consumers dictate through mill shutdowns, purchasing and consumption variation
- Current conditions make it impossible to plan effectively – loggers are constantly being given conflicting information
- Difficult to purchase stumpage / deliveries without knowing what future holds
- Not enough information on wood demand or products
- Company has monopoly and tells loggers 1 week in advance of shutdowns
- Selling of land, high personnel turnover, reduces stability needed to develop relationships
- Needs of consumer not shared with the supplier

Consumer actions have many of the same impact on dealer as they do on loggers. Depending on the arrangement that the dealer has with the consumer some dealers are even more damaged by the actions of the consumer. Dealers who work directly as a pass through for a single consumer are limited in what they can haul to mills other than their primary consumers making it harder to schedule loggers and tracts. Without good information in advance dealers are forced to move loggers and shift production at an ever-increasing pace. Increasing the variability of the system decreases the efficiency and increases the corresponding cost to the logger, dealer, and in the end the consumer.

**What do you personally think could be done in terms of planning and communication to make your job easier?**

- More information on planning from the consumer, better planning between the dealer and the logger
- Procurement is procurement (goes from easy to hard and back)
- More direct contact with loggers that I am working with
- Have wood yard run by forestry people instead of mill people
- More lead time for changes in quota, shutdowns, and consumption changes
- More long range planning by consumers and better communication with suppliers about these plans
- Long term forecasts (that have longer time frame and are reliable)
- More timely and better information on shutdowns and quotas
- Longer time commitment on prices given by the consumer

Consumers who work with dealers should afford them the same consideration that they do their suppliers. Dealers should be provided with as much information as possible due to the large amounts of volume that they deal with. Providing long-term information to dealers gives them better opportunities to pass this information on to loggers that they work with.

## RECOMMENDATIONS

### **5. Recommendations**

The following are recommendations related to the results discussed prior. Recommendations come from the interviews themselves; debrief meetings with researchers, and from the researchers based on overall observations that were made. While the results of this study seem to focus on some of the negative activities being carried out in the industry, all parties in the system have the potential to benefit from better exchange of information and improved planning methods. Many of the suggestions that are made require little capital and hold the potential to improve the efficiency and reduce costs for the party involved.

A matrix connecting the different planning opportunities and to the affected party was created. On the top of the matrix is the affected party on the left is the planning opportunity. Dollar signs at the top of each block indicate the magnitude of opportunity, in terms of percent improvement in overall timber harvest and transportation efficiency.

\$ - 1-3% improvement    \$\$ - 4-8% improvement    \$\$\$ - 9-14% improvement

| <b>Planning Opportunity</b>                      | <b>Mill Management</b>                                                                                                                                                                                                   | <b>Procurement</b>                                                                                                                                                   | <b>Supplier</b>                                                                                                                                        |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1. Wood Flow Planning</b>                     | <p><b>\$\$\$</b></p> <p>Make available the annual wood consumption predictions and inventory requirements. Provide monthly update on wood supply requirements, including log specification and shutdown information.</p> | <p><b>\$\$</b></p> <p>Convert long term wood supply into specific harvest plans. Project wood flow from individual tracts, and adjust when assigned to supplier.</p> | <p><b>\$</b></p> <p>Inform procurement of (a) purchased stumpage (volume and specs) and (b) expected changes in wood flow.</p>                         |
| <b>2. Tract Allocation</b>                       | <p><b>\$</b></p> <p>Avoid artificial budget constraints for procurement to purchase standing inventory.</p>                                                                                                              | <p><b>\$\$\$</b></p> <p>Match stand and terrain characteristics with harvesting system. Allocate more than one tract at a time with adequate lead-time.</p>          | <p><b>\$\$</b></p> <p>Determine harvest system efficiency for key stand and terrain parameters.</p>                                                    |
| <b>3. Communication</b>                          | <p><b>\$\$</b></p> <p>Use modern communication systems to adjust existing plans, not replace planning. Provide enough information for planning to take place.</p>                                                        | <p><b>\$\$</b></p> <p>Provide timely information to suppliers regarding expectations and changes.</p>                                                                | <p><b>\$</b></p> <p>Use communication to complete feedback loop by providing 'procurement' with pertinent tract, move, and production information.</p> |
| <b>4. Production monitoring and Rate Setting</b> | <p><b>\$</b></p> <p>Guide price setting by publishing expected raw material costs.</p>                                                                                                                                   | <p><b>\$\$</b></p> <p>Adjust matrix prices to account for lost production. Allow suppliers opportunity for input into cost calculations.</p>                         | <p><b>\$\$\$</b></p> <p>Determine key productivity parameters for the harvesting system. Discuss changes anticipated in the harvesting system.</p>     |
| <b>5. Truck Scheduling / Coordination</b>        | <p><b>\$</b></p> <p>Keep mill turn time to a minimum.</p>                                                                                                                                                                | <p><b>\$\$</b></p> <p>Match trucking setup to haul. Minimize reactionary changes of delivery points.</p>                                                             | <p><b>\$\$</b></p> <p>Develop trucking system to satisfy the majority of tracts harvested.</p>                                                         |

Figure 3. Planning opportunity matrix

### 5.1 Wood Flow Planning

Efficient and predictable wood flow is critical to a stable and profitable forest industry. However, a balance must be achieved between the benefit of decreased inventory and having enough inventory buffers to allow for rational timber harvesting planning and efficient harvesting operations. Long-term wood flow planning, updated to meet short-term fluctuations, with a strong and formal communication network through procurement to the suppliers is required. The goal is to stabilize the wood flow and minimize the raw material cost. With the increasing frequency of changes and decreasing lead times between changes,

consumers are forced to operate in a reactive manner. This reactive nature requires loggers to shift production, move from tracts, and carry some level of inefficiency. The ability of employees of consuming mills to predict wood needs and flows are greatly diminished. If the procurement segment does not know from week to week what will be required, it cannot effectively manage wood flows or plan purchases from suppliers.

For comparison, a study on the use of a computer supported wood flow system was conducted for large-scale plantation forests by the New Zealand Forest Research Institute. The results of potential savings are shown in Figure 4.



Figure 4: Potential benefits from improved 'wood flow' management in large-scale production forests (FRI, 2001).

Mill management should maintain necessary information to make consumption and inventory decisions relative to its goals. These goals should then be converted to more immediate supply requirements (volume and specifications) with indications of predicted changes for the future and then made available to the procurement organization. Currently, volume requirements change as frequently as once per day. Mill focus will also change more frequently than 6

months (for 46% of the mills). Specific information should be made available and should include when the change will take place, how the change will affect current inventory, how the change will affect future purchases, when the change will be implemented, and if possible how long the change will last.

Mill management may gain efficiencies by developing a 12-month consumption and inventory plan available for both procurement and suppliers. A 2-4 week immediate supply and specification plan should also be produced. This plan should indicate upcoming changes in mill focus or information on any planned shutdowns that the mill anticipates. Affected parties can then use the information provided to plan their operations. For example, loggers who know when a shutdown is planned can idle their operation (for maintenance or vacation) and eliminate lost time when the shutdown occurs. To maintain market flexibility, this document should not be a fixed contract, but should be taken seriously as it affects the efficiency (including price) of the raw material supply.

Providing a long-term plan provides suppliers with a sense of stability, and allows procurement to plan company timber sales, wood dealers to adjust tract purchases, and loggers to plan for long term goals such as machinery investments. Incorporating a more immediate supply and specification plan allows procurement personnel, wood dealers or loggers with multiple tracts to make educated choices about where to harvest next.

Procurement organizations should relate the long-term wood supply plan to their more specific harvest plans, with an expected wood supply flow being calculated from each tract to be harvested. The tracts can then be allocated to the supplier that provide the best fit, or allocated to a preferred supplier of the organization. Suppliers and wood dealers should be informed of tract allocation procedures and supply requirements, specifically as it relates to their tract purchases. Just over 50% of the suppliers interviewed indicate that the companies did not understand the effect that lost production has on an operation. Of the suppliers interviewed, over two thirds carried unused capacity on their harvesting operations, half of those specifically to increase productivity in case a quota will be introduced.

Expected wood flow, broken down into key product categories, should be established for all tracts on the books. These projections need to be updated after a specific supplier is assigned the tract to account for the harvesting capabilities. Tracts with higher value timber or difficult terrain should be assigned to suppliers with those capabilities. For those companies operating a preferred supplier system, 80% of their annual consumption should be assigned to preferred / core suppliers well in advance. The remaining 20% can be purchased from the open market in times of need and given to preferred / core suppliers in other times.

Providing adequate lead-time to suppliers will allow the opportunity to select (and purchase in the case of independent suppliers) tracts that better fit into supply and specification goals of the consumer. In cases where packages are offered the supplier should have the opportunity to select or save tracts that allow maximum efficiency and productivity. Just over 50% of suppliers did not know their market at least a month ahead of time, and just over 70% did not rate their organization as being very helpful in setting supply targets.

Suppliers should maintain communication with the procurement organization relating to purchase timber and standing inventory supply levels that they expect to maintain. Suppliers should give procurement organizations the maximum amount of lead-time possible before finishing (or moving from) a tract. Suppliers should assist the procurement organization in determining a realistic production goal for each tract, discuss the opportunity for increased production if required as well as discussing the impact on profitability of lost production. Each tract that is harvested should be evaluated for weekly production and factored in to the weekly consumption requirements of the consumer. Providing information about moves allows the consumer to plan his wood flow and allocate tracts accordingly thereby allowing consumers to better match the type and size of tract to the logger, as opposed to allocating tracts in a rotation (first come first serve) fashion.

## **5.2 Tract Allocation**

Allocation of timber resources to suppliers in a timely and effective manner has the ability to increase efficiency and reduce costs for both the consumer and the supplier. Tracts can have a large number of different potential product sorts, and price and volume expectations can change over time, so tract allocation planning is critical (Holmgren and Thuresson, 1997).

Next to the management of overall wood flow, tract allocation has been identified as the second most important planning issue to increase overall efficiency.

Tract allocation not only affects wood flow, but also has great effects on raw material costs and logger profitability. Mill management should not constrain procurement through unnecessary budget restrictions. If market prices change the procurement budget should reflect the change in order for enough standing inventory to be acquired to maintain consistent allocation procedures and therefore uninterrupted wood flow.

For tract allocation planning to be effective, it is recommended that the supplier be involved. Each portion of the planning process that the supplier is left out of greatly eliminates the ability to accurately plan a harvesting or trucking system that will satisfy the needs of the consumer without building inefficiency into the system. To further compound the problem 68% of consumers stated that loggers had no involvement in the location of their next tract, 34% stated that the logger had no involvement in tract layout, 34% stated that loggers had no involvement in determining when the tract would be harvested, and 50% stated that the logger had no involvement in determining where products would be delivered.

Tracts available for assignment should be matched to each individual logger's system capabilities, in addition to selecting the most efficient supplier. This requires procurement to have stand and terrain parameters that will affect the harvest system choice available for the decision making process.

For each tract on the books, the consumer should have information on location, volume (by product), type of system required to harvest, and some form of operability window for which the tract is harvestable. Consumers should then provide at least 3 months worth of tracts to suppliers who they work directly with. Procurement organizations should be willing to accept input from the supplier on which tract to harvest next. Providing suppliers with more than one tract reduces the amount of contact needed on the part of the procurement organization and also provides the supplier with an extended planning window. Package arrangements provided by the consumer should be honored in their entirety and should be representative of the amount of annual supply that is expected from the supplier.

The benefit of working through a dealership is that it frees the procurement organization to focus on other aspects of wood flow. Once the dealer has been allocated tracts it becomes their responsibility to ensure that the tracts are then passed to suppliers and that consistent wood flow from those tracts is maintained.

Suppliers should know the limitations of their harvesting system, especially how stand and terrain parameters affect the efficiency of their operation. This should be done through a harvest system evaluation that indicates the desired operating range, including how the operating factors affect the efficiency of the operation (i.e. the logging rate). Suppliers need to keep their immediate (wood dealer or consumer) organization informed of their progress on harvesting a tract. Suppliers must be willing to interact with the consumer to agree on the best course of action. Both parties should be willing to acknowledge and discuss issues brought to the table from the other party.

Mill management should not constrain procurement through unnecessary budget restrictions. If market prices change then the procurement budget should reflect the change in order for enough standing inventory to be acquired to maintain consistent allocation procedures and therefore uninterrupted wood flow.

Tracts available for assignment need to be matched to each individual supplier's system capabilities, in addition to selecting the most efficient supplier. This requires procurement to have stand and terrain parameters that will affect the harvest system choice available for the decision making process. The harvest area should be evaluated for the following parameters; average piece size, average extraction distance, tract size, number of product sorts, trucking distance, and soil strength. Approximately 2 weeks prior to completion of the tract suppliers should notify the consumer (assuming that the tract that is being harvested is large enough) of the status of the tract and the time to completion. Suppliers should also provide a two-day warning if approaching a section of the tract that will deliver significantly different volume or product type to the mill.

Currently, very few suppliers have documented the impact that changing parameters have on logging efficiency. Improved feedback on supply allows procurement organizations (or dealer) to continually adjust wood flow through rational decisions, such as assigning a logger about to complete a tract to a new tract that suits supply requirements. This “decision process” eliminates the more typical ‘knee-jerk’ reaction to changes in wood flow.

### **5.3 Communication**

Communication is critical, be it in providing written plans or making personal contact regarding key planning elements. Good open lines of communication provide for greater understanding of the overall plan but also allow affected parties to be informed of any short-term adjustments. While the survey showed intensive communication between front-line foresters and suppliers, typically at least twice a week, communication between loggers and middle or upper management was much less frequent. While communication with front line foresters is crucial to the successful implementation of a plan, communication with those responsible for the creation of the plan is just as important. The expected improvement in system efficiency based on improved communication is linked to the information being exchanged. The expected value of the improvement (shown as being 1-3%) is therefore only approximate.

Mill management plays a key role in determining wood flow. As mentioned previously, plans developed need to be accessible to both the procurement organization and suppliers that it is intended for. While informal communications between colleagues provide for the greatest degree of understanding, written plans promote long-term thinking and provide the reader with a sense of security.

Provide succinct written plans in a format that outline the key planning parameters. For this example key planning parameters would include inventory, supply, and log specification requirements. Once the plans have been created they should be made available (in hard copy form) to the affected parties. By keeping all levels of the organization informed about current conditions, open lines of communication between the consumer and the supplier can be formed. This open communication will allow information to be transferred in a more timely and efficient manner.

Forest operations remain a highly variable work environment where many unforeseen circumstances can occur. The communication link between procurement (or logger management) and the suppliers is important. Based on results of this project, contact is made twice a week, either through field visits or by phone with most information being transferred in verbal form. Provide a written contract to the supplier outlining expectations and obligations. Of the loggers interviewed 18% stated that better lead time information was needed, 8% wanted better information on quota. Eleven percent stated that they felt they received good information while 23% stated that mill and industry changes determined the amount and quality of information received. Information that loggers felt would improve their ability to plan included information on future mill supply needs (21%), better lead time information (19%), and better information on shutdowns (13%). When visiting the supplier, provide current (as current as feasible) information concerning supply levels, inventory levels, and foreseen changes that have the potential to affect the productivity of the operation.

Improved lines of communication will make adjusting to changes smoother and more efficient. If suppliers are aware of market demands they are better able to procure stumpage that satisfies the needs of the consumer. By satisfying the needs of the consumer the supplier is able to remain productive for more days per year thereby reducing the per unit cost of the operation.

It is the responsibility of the supplier to ensure that the consumer (procurement organization) has as much information about current status of the system as possible. Suppliers should keep consumers informed of any changes that they foresee in the future and should inform the consumer of any planned moves or reduction in productivity levels of the operation.

Suppliers should discuss the cost benefit of equipment purchases prior to purchase or changes in system prior to implementation. Any scheduled downtime that the supplier plans to take should be provided to the consumer on a quarterly basis (or at least one month in advance). Suppliers should ensure that the consumer is apprised of current conditions related to productivity on a bi weekly basis.

By discussing system changes (purchases) prior to implementation the supplier can gain valuable insight as to the fit of the changes into the overall supply system. Suggestions by the consumer may alter or enforce the decision to change. Providing information about scheduled downtime in advance provides the consumer with the opportunity to shift production to other areas thereby ensuring consistent wood flow.

#### **5.4 Production Monitoring and Rate Setting**

While focusing on production meets basic supply and demand requirements of the wood supply chain, it is the efficiency of the system that determines the raw material costs. Currently, the industry does not focus on efficiency; the survey indicated that fewer than 35% of management and 25% of suppliers had a good grasp of production efficiency variables. The two fundamental ways to set logging prices are 'fair' and market competitive approach. When dealing with a preferred supplier network, predicted logging costs must be matched with predicted (which are reasonably determined) production rates to establish a 'fair' logging rate. While some companies have placed great emphasis on developing detailed pricing matrices based on the many variables that affect cost, little effort has gone into developing production models to complete the equation.

The second, and more competitive approach to setting the logging rate is a true free market approach whereby the organization sets out obligations in a contract for a tract and suppliers bid on the contract. This allows suppliers to implement harvest system improvements without being financially penalized by the consuming organization. In theory it also allows the strongest and most competitive suppliers to dominate (provided that the contract requirements set precedent for business and environmental compliance).

Mill management is typically not directly involved in setting logging rates (merely in setting overall wood cost guidelines), however they can help guide the process by publishing their expectations of raw material costs for the near future. Mill management should recognize the importance of maintaining an open and competitive market and recognize that promoting operational efficiency requires an understanding of what affects operational efficiency and how their actions can impact the overall efficiency of an operation.

In most instances it is the procurement organization that is responsible for setting the rate that is paid to the supplier. The procurement organization should recognize that a supplier who is able to maintain adequate cash flow is more agreeable and better able to withstand short periods of lost production (from quotas or shutdowns). Furthermore, a supplier who is constantly challenged with maintaining cash flow is less focused on the quality of work that is being performed.

The consumer and supplier should at a minimum discuss rate calculations on a quarterly basis. Currently rates are set on a tract-by-tract basis and generally just prior to the start of logging. Of the consumers interviewed 68% stated that they agreed on the logging rate immediately prior to the start of the harvest. By agreeing on rates beforehand both sides have the opportunity to justify their respective needs. Consumers are better able to forecast costs related to harvesting and suppliers are better able to predict cash flow. Impacts of unforeseen changes in cost should be reviewed and the rate adjusted accordingly.

Suppliers who feel that their compensation rate truly reflects the cost of their operation are more likely to accept tracts that do not meet their demands or match their equipment spread, on a limited basis. If loggers are able to maintain an acceptable profit level on the majority of tracts and provided that an adequate return on investment is present, they will be more capable of harvesting marginal tracts. This will be accomplished by having a cash buffer that will allow for reduced cash flow, especially if they are aware of upcoming tracts that will generate needed cash.

Maintaining a tight grip on all information related to allocation intensifies the workload of procurement personnel by increasing the amount of negotiation time and hand holding required when tracts are completed. With price agreed upon beforehand loggers and procurement personnel can determine the next move prior to completion of the current tract thereby reducing the amount of personal interaction needed during moves. Justification of price should not be used as a 'weapon' for either side to gain the upper hand. The overall goal of profitability (and how the success or failure of one side affects the other) should be at the top of the priority list.

Dealers and loggers should maintain productivity and stand parameter information in order to develop a reasonable logging rate that provides for costs and generates a return on investment that is acceptable in the market place. Break-even rates are acceptable for a small percentage of annual supply but cannot be the basis for the calculation. Capital at risk must show some level of return or there is no benefit to the risk.

The consumer and supplier should at a minimum discuss rate calculations on a quarterly basis. These discussions should include any changes in the system that the supplier foresees, changes in the market, changes in cost of consumables necessary to run the operation, and changes in the productivity of the operation. Impacts of unforeseen changes in cost should be reviewed and compensated for.

Suppliers are more likely to be open with cost figures if they feel that the information is being used productively. Suppliers who feel that their compensation reflects their cost are more likely to accept changes that are sought by the consumer. Furthermore, suppliers that feel that rates are in line with costs and conditions show more enthusiasm in maintaining a working relationship with the consumer (make a man profitable and he will be more likely to work with you than a man that is struggling to meet obligations).

Another factor affecting the loggers ability to have known cash flows is the increasing presence of 'matrix pricing' systems. These systems use the logger's equipment mix, manpower, and production level to generate a basic daily cost for the system. Additional compensation can be added for extended haul distances, stand composition or harvest type. Once the information has been gathered it is entered into a spreadsheet and corresponding prices are generated. The price is determined using average production numbers (generally from the past year) and estimated equipment costs.

Most loggers agree that the base assumptions of the systems are valid but contend that the matrices do not reflect actual production levels. Different production levels can result from poor planning; weather and consumer imposed restrictions in terms of quotas or mandated moves. The majority of loggers interviewed felt that the rates were adequate if the system was

allowed to operate at consistent production levels. If the prevailing production level is less than the assumed level the corresponding rate is invalid.

Loggers report that they are being moved (more?) often. However, those entities requiring loggers to move are not compensating them for their moves. Loggers are being moved for a variety of reasons, including the very short planning horizons necessitated by constantly changing mill requirements (or more specifically, lack of communication of change of mill requirements). However cases were also reported where loggers were being moved to control wood cost, that is, to make sure that the average wood cost to the consumer met some pre-determined monthly level.

Consumers and loggers both gave production as one of the main justifications for moving from a site. Through the course of the interview process it became more obvious that loggers needed to work every available hour in order to maintain enough cash flow to keep the operation running. Many loggers are operating so close to the break even that they must work. However being productive and being efficient are often confused in the forest industry. Just because an operation is able to reach its goal for production on any given day does not mean that it is efficient. Efficiency by definition requires the operation to employ all of its resources to the maximum benefit. If loggers are to continue to focus on production consumers must be willing to pay for the corresponding inefficiencies that result. In fact many of the consumers interviewed did not see the advantage of having a logging contractor that was profitable, much less one that had adequate cash reserves to 'wait out' a rain event as opposed to run from it.

## **5.5 Transportation Scheduling / coordination**

Transportation continues to be one of the main components of raw material cost. Loggers typically have approximately \$250,000 invested in trucking. Of loggers interviewed 45% report that their trucking is mismatched to the trucking requirements of a tract at least 10% of the time.

Trucking adds cost to the wood on both the consumer and supplier ends. In situations where trucking is mismatched to the haul the supplier is forced to deal with the resulting misuse of capital. This misuse can take the form of money invested in idle trucking assets or in premiums

(beyond the cost of owned capacity) paid to contract haulers. Trucking continues to be approximately 40% of the overall cost of getting wood to the mill. In situations where trucking is mismatched to the haul the supplier is forced to deal with the resulting misuse of capital. This misuse can take the form of money invested in idle trucking assets or in premiums (beyond the cost of owned capacity) paid to contract haulers. The consumer in turn pays for this misuse of capital through higher logging rates.

Mill management should provide the procurement organization with information detailing supply volume expected from each supply region as well as expected cost levels for this supply. Information about the amount of consumption and any changes anticipated in facilities would be helpful. Providing the procurement organization with expectations related to transportation allows the organization to design a transportation system adequate for their needs. A previous WSRI study (Deckard, 2001) showed that truck turn time at the mill was a serious problem. It was estimated that the cost of excessive turn-time was \$30 million for the Southeast region.

Deckard indicated that approximately 20 minutes is an appropriate turn-around time for a truck at the mill. Mill management should provide the procurement organization with information detailing supply volume expected from each supply region as well as expected cost levels for this supply. Information about the amount of consumption and any changes anticipated in facilities would be helpful.

Providing the procurement organization with expectations related to transportation allows the organization to design a transportation system adequate for their needs. Since the procurement organization is responsible for allocation of tracts to suppliers it is their responsibility to see that the supplier matched to a site has adequate trucking capacity to maintain efficiency. Of the loggers who experience trucking mismatch approximately 27% state the reason for the mismatch as being some form of uncertainty in the expected haul distance to adequately plan for. The procurement organization should also be aware of additional demands placed on contract trucking assets when supply is low and demand is high. Most contract truckers will go to the highest bidder and if the procurement organization is paying premium rates from one region, then another region is likely to suffer lack of capacity.

The procurement organization should take supply volumes provided by the mill and determine which contractors are going to be used to generate volumes for each area. The procurement organization should then pass this information along to the supplier with information about maximum trucking distance expected, and specifications of material. Any changes that are anticipated (or unexpectedly arise) should be discussed with the supplier.

By maintaining communication concerning trucking fleet availability and requirements, the consumer can better match the supplier to the haul. Suppliers' benefit through maximum return on capital invested in trucking fleet and the consumer benefits by maintaining wood cost by not compensating suppliers for carrying excess capacity.

McDonald (2001) showed that a 12% increase in wood flow can be expected when using a shared truck resource (e.g. contract trucking), indicating that suppliers should use contract trucking to offset demand requirements as necessary.

The supplier must keep the consumer informed of the status of the trucking system. Any changes that are anticipated should be discussed with the consumer, prior to implementation, to ensure that changes are applicable with the consumer's system.

Through continued communication between the supplier and the consumer both parties are able to maximize the value of the trucking system. The consumer benefits by employing the minimum amount of trucking capacity required to move the material (thereby reducing the amount of interaction necessary). The logger benefits by only investing the amount of capital necessary to supply his volume, which reduces the amount of waste that the system incurs and increases the amount of return on capital invested.

## **6. Discussion**

This study generates as many questions as it does answers. As is normally the case after the study was complete, thoughts of additional studies to answer other questions abounded.

All parties agree that planning is important and that more information is needed to be better able to plan. More timely transfer of information is also needed to ensure that the effects of obstacles are dealt with before they reduce the efficiency of the operation. The disagreement arises over what amount of responsibility each group has. Each of the groups interviewed had different perceptions of what information was needed and how to deliver it to the corresponding parties in the system.

This study showed that planning in the forest industry is reactive rather than proactive. By its nature planning has to be a proactive measure in order to identify and eliminate the affects of obstacles before they reduce the efficiency of the system. Consumers, loggers, and wood dealers currently do not focus a lot of their time on planning, and are more focused on production than on efficiency. As stated earlier an operation can be productive and inefficient at the same time.

Consumers creating Just In Time (JIT) systems are adding additional complication to the system. While JIT systems reduce the overall cost of inventory, any individual responsible for implementation of a JIT system will tell you that the success of the system begins with a well thought out and planned system. Constant monitoring of the system is needed to ensure that it is working properly. While companies are saving money in terms of capital employed for inventory they are shifting these costs to the producing segment, whether it be to the logger or to the wood dealer. In the end the cost must be compensated in some manner; if not the supplier will be unable to maintain cash flow.

The increasing popularity of wood dealerships puts an additional gap between the consumer and the logger. Wood dealer compensation comes directly at the loss of the logger. For each unit produced the dealer receives a fee. This fee normally comes from the logger for the use of

the dealership's contract as an outlet for production. The consumer is able to pay a set fee to the dealer and then the dealer must find loggers that are able to work at rate below that (with the dealers margin being the difference). This margin is money that the consumer could use to compensate the logger providing him with more profit without increasing the mill's cost. Since all three groups are facing market downturns, increased costs, and increased constraints, any opportunity to benefit the operation without adding costs must be investigated.

Consumers in attempt to maintain distance between themselves and the harvesting systems have undertaken various methods to shift the focus of wood supply to the logger and wood dealer. For consumers it is important to realize the role that the harvesting function has in the overall success (and corresponding profitability) of their organization. While it is simple to say that it is the problem of the contractor to maintain profits under the constraints currently present in the system, it also in the best interest of the consumer to maintain high quality suppliers. High quality suppliers are more dependable and better able to produce in times of need. There is less environmental liability from a properly trained logger and in general loggers of this type are more amiable to changes provided that they are able to maintain a reasonable cash flow and profit level.

## **6.1 Using the information**

This information gives the reader detailed descriptions of areas in the current wood supply system that need to be addressed to maintain optimum efficiency. Each of the five areas identified have a direct impact on how the system is allowed to operate.

Individuals who read this report should use the information given and the matrix provided to determine their location in the wood supply system. After determining where they are located they can then identify, based on their current needs and abilities, what steps can be taken to improve their system. Once the steps have been agreed upon a course of action should be determined to move the system closer to optimum. Constant monitoring of implementation of the plan should be performed to ensure that the plan is achieving the desired results.

Aside from direct action readers should look further into the information provided and see what directly relates to their organization. Readers can interview their respective suppliers and

determine what, if anything needs to be improved in their system. These interviews can also serve as a communication tool for suppliers who would not otherwise bring concerns to the table. Finally, the organization should allow those interviewed the opportunity to provide input into the plan. Even though the plan may not be implemented as they have suggested those involved will feel that their concerns have been considered and the lines of communication are open for their use.

## **6.2 Other work**

Additional work that could be done related to this project could include monitoring changes that have taken place in planning and communication from year to year. Based on the theory that planning should be an evolving process it would be important to know how suggestions made in this report were implemented and the corresponding amount of success. As companies begin to make changes additional areas of improvement that were not discussed in this report will be identified. Determining the next set of opportunities to be improved upon could be one result.

Determining the cost of implementation of the suggested opportunities is another area that could be investigated. As mentioned earlier the cost of implementation must be less than the gain or the usefulness of implementation will be questionable. Determining the cost of current losses as a result of poor or improper planning could also be investigated. This report used percent gains as evidenced in literature but actual cost figure would be beneficial.

A final investigation related to this report could be a reevaluation of the study area at some point in the future. When possible, contact of those organizations that were interviewed in the initial study to determine what changes have taken place could be performed. Information gained in this process would serve a two-fold purpose. First it would provide documentation of what changes have been made since the suggestions of the first study were made public. Second it would give investigators information related to how the changes have affected the efficiency of the operations and would provide information on what the current planning opportunities were.

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## Appendices

### Questionnaires

#### Logger Questionnaire

#### SYSTEM ATTRIBUTES

1. Describe your logging system (**List specific equipment**).  
Felling \_\_\_\_\_ Age \_\_\_\_\_  
Skidding \_\_\_\_\_ Age \_\_\_\_\_  
Loading \_\_\_\_\_ Age \_\_\_\_\_  
Road Building \_\_\_\_\_ Age \_\_\_\_\_  
Processing \_\_\_\_\_ Age \_\_\_\_\_  
Hauling \_\_\_\_\_ Age \_\_\_\_\_
2. If you had to replace all the in woods equipment on your job with new machines, what would it cost (**Choose only one**)?  
\_\_\_\_\_ less than 500,000 \_\_\_\_\_ 500,000 – 1,000,000 \_\_\_\_\_ 1,000,000 – 2,000,000  
\_\_\_\_\_ over 2,000,000
3. How much money have you got tied up in trucks? \_\_\_\_\_
4. How many tons do you produce a week on average? \_\_\_\_ lds x \_\_\_\_ tons/ld \_\_\_\_ days = \_\_\_\_\_
5. How many weeks per year do you plan to work and how many weeks do you actually end up working? \_\_\_\_\_ weeks planned \_\_\_\_\_ actual weeks  
  
(Categorize annual production based on answers to previous question.)  
\_\_\_\_\_ less than 7500 tons \_\_\_\_\_ 7501 – 15000 tons \_\_\_\_\_ 15001 – 30000 tons  
\_\_\_\_\_ 30001 – 60000 tons \_\_\_\_\_ 60001 – 100000 tons \_\_\_\_\_ 100001 – 150000 tons  
\_\_\_\_\_ 150001 – 200000 tons \_\_\_\_\_ more than 200000 tons
6. Do you have any extra or 'backup' equipment (**Check all that apply**)?  
\_\_\_\_\_ felling \_\_\_\_\_ skidding \_\_\_\_\_ road construction \_\_\_\_\_ loading \_\_\_\_\_ processing  
\_\_\_\_\_ hauling
7. Why? \_\_\_\_\_
8. If you could replace one machine on this operation, which would it, be?  
\_\_\_\_\_ feller \_\_\_\_\_ skidder \_\_\_\_\_ road builder \_\_\_\_\_ loader \_\_\_\_\_ truck \_\_\_\_\_ processor  
Why? \_\_\_\_\_

9. What percentage of the time is your equipment spread not well suited for the tract that you are harvesting?

\_\_\_\_\_

10. What percentage of the time do you have too much or not enough truck capacity?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

11. What do you think would be an ideal harvesting system for your area?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## COMMUNICATION

12. How often do you talk business with:

|           | Landowner | Front line forester | Foresters supervisor | Supervisor's supervisor |
|-----------|-----------|---------------------|----------------------|-------------------------|
| Daily     |           |                     |                      |                         |
| 2 -3 days |           |                     |                      |                         |
| Weekly    |           |                     |                      |                         |
| Monthly   |           |                     |                      |                         |
| Annually  |           |                     |                      |                         |
| Never     |           |                     |                      |                         |

13. How would you rate the exchange of information related to **(Use scale B)**

\_\_\_\_\_ mill shutdowns \_\_\_\_\_ quota \_\_\_\_\_ profitability \_\_\_\_\_ contract requirements  
 \_\_\_\_\_ BMP compliance \_\_\_\_\_ contract compliance \_\_\_\_\_ machine utilization  
 \_\_\_\_\_ other?

14. Do you feel that you receive enough information in a timely manner from the mills that you supply to adequately plan your operation **(Please explain)**.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

15. For the mills you supply, what additional information could they provide to improve your \_\_\_\_\_ ability \_\_\_\_\_ to \_\_\_\_\_ plan?

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## PLANNING

16. What percentage of the timber you harvest do you buy yourself?  
\_\_\_\_\_ less than 25% \_\_\_\_\_ 25 – 50% \_\_\_\_\_ 50 – 75% \_\_\_\_\_ 75 – 100% on your own

17. What kind of planning do you do for your logging business and on average what % of your time do you spend on planning?

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18. How involved is the company (dealer) in planning for your business? (Use scale A)  
\_\_\_\_\_ tract location \_\_\_\_\_ harvest layout \_\_\_\_\_ access \_\_\_\_\_ time of harvest  
\_\_\_\_\_ delivery of products

19. Do you have a long-term plan for the growth and improvement of your logging business?  
\_\_\_\_\_ yes \_\_\_\_\_ no

20. If yes, what does it involve? If no, why not?

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21. If you buy your own stumpage, how much stumpage do you usually keep ahead?  
\_\_\_\_\_ 1 week \_\_\_\_\_ 1 month \_\_\_\_\_ 3 months \_\_\_\_\_ 6 months \_\_\_\_\_ 1 year

22. To optimize your operation how much timber do you need to have purchased in advance?

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23. How far ahead do you know where you will be selling your timber (categorized by product)?

\_\_\_\_\_ 1 week \_\_\_\_\_ 1 month \_\_\_\_\_ 3 months \_\_\_\_\_ 6 months \_\_\_\_\_ 1 year \_\_\_\_\_ 3 years

24. If stumpage is provided for you, how much notice do you get before moving to a tract?

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25. Is this enough time? \_\_\_\_\_ yes \_\_\_\_\_ no

26. If not, why not, and how much lead-time would be acceptable?

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27. How helpful are the mills (or dealer) you log for in helping your operation set realistic production goals (**Choose only one**)?

\_\_\_\_\_ not helpful \_\_\_\_\_ somewhat helpful \_\_\_\_\_ very helpful \_\_\_\_\_ indifferent

28. Do you think that the mills (dealers) understand the effects that lost production has on your operation? \_\_\_\_\_ yes \_\_\_\_\_ no

29. How do actions of the consumer / mill impact your ability to plan for your operation?

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## **PURCHASING**

30. Do you generally log for a forest products company or wood dealer, or do you buy your own stumpage and market it independently?  
\_\_\_\_\_ contract log \_\_\_\_\_ independent

31. When is the compensation (cut and haul rate) for a tract typically determined?

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32. What are the major factors that affect your logging cost?

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33. Which of these factors are included in the negotiations to determine the cut and haul rate for a given tract?

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34. How is the timber that you produce hauled (**Rank by percent**)?  
 \_\_\_\_\_ on trucks owned by the logging company  
 \_\_\_\_\_ separate trucking company owned by the same group  
 \_\_\_\_\_ contract trucking  
 \_\_\_\_\_ consumer supplies trucks
35. How are paid for trucking (**Choose only one**)?  
 \_\_\_\_\_ part of logging rate \_\_\_\_\_ separate from the logging rate \_\_\_\_\_ consumer provides
36. Who determines how and where secondary products (i.e. peeler logs) will be marketed?  
 \_\_\_\_\_ self \_\_\_\_\_ forester \_\_\_\_\_ wood dealer \_\_\_\_\_ landowner \_\_\_\_\_ consumer
37. How are secondary markets selected (**Answer only if 36 = self**)?  
 \_\_\_\_\_ cost \_\_\_\_\_ availability \_\_\_\_\_ distance \_\_\_\_\_ economic feasibility \_\_\_\_\_ specs
38. Are you a preferred / core supplier of any company? \_\_\_\_\_ yes \_\_\_\_\_ no
39. Are you a preferred / core supplier for more than one company? \_\_\_\_\_ yes \_\_\_\_\_ no
40. How many days per year do you lose to weather related downtime?  
 \_\_\_\_\_  
 \_\_\_\_\_
41. What do you personally think could be done in terms of planning and communication to make your job easier?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## Wood Dealer Questionnaire

### GENERAL

1. How many tons of wood do you supply annually?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. What percentage of the timber that you harvest is  
\_\_\_\_\_ privately owned \_\_\_\_\_ company owned
3. How many loggers / wood dealers do you compete within your region ? \_\_\_\_\_

### COMMUNICATION

4. What quality of information is exchanged between yourself and the consumer (**scale B**)  
\_\_\_\_\_ sale \_\_\_\_\_ mill shutdown \_\_\_\_\_ quotas \_\_\_\_\_ price \_\_\_\_\_ profitability
5. What quality of information is exchanged between yourself and the logger (**scale B**)  
\_\_\_\_\_ sale \_\_\_\_\_ mill shutdown \_\_\_\_\_ quota \_\_\_\_\_ price \_\_\_\_\_ profitability
6. How do you receive information about market changes from the consumer (**Choose all that apply**)?  
\_\_\_\_\_ phone \_\_\_\_\_ personally \_\_\_\_\_ written \_\_\_\_\_ fax \_\_\_\_\_ other \_\_\_\_\_ logger
7. How do you pass information about market changes to your loggers (**Choose all that apply**)?  
\_\_\_\_\_ phone \_\_\_\_\_ personally \_\_\_\_\_ written \_\_\_\_\_ fax \_\_\_\_\_ other \_\_\_\_\_ logger
8. For the mills you supply, what information could they provide to improve your ability to plan?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### PLANNING

9. How involved are you in planning of the activities listed below for loggers that you work with (use **scale A**)?  
\_\_\_\_\_ tract location \_\_\_\_\_ sale layout \_\_\_\_\_ access \_\_\_\_\_ time of harvest \_\_\_\_\_  
delivery of products \_\_\_\_\_ BMP's

10. How much involvement does the consumer have in planning the following activities:  
(use **scale A**)? \_\_\_\_\_ tract location \_\_\_\_\_ harvest layout \_\_\_\_\_ tract access \_\_\_\_\_ timing of harvest
11. What other parties do you receive assistance from when planning?  
\_\_\_\_\_
12. Do you have a long term plan for the growth and improvement of your business?  
\_\_\_\_\_ yes \_\_\_\_\_ no
13. If yes, what does it involve, if no why not?  
\_\_\_\_\_  
\_\_\_\_\_
14. What is your planning horizon for equipment purchases? \_\_\_\_\_ Not Applicable  
\_\_\_\_\_ 1 week \_\_\_\_\_ 1 month \_\_\_\_\_ 3 months \_\_\_\_\_ 6 months \_\_\_\_\_ 1 year \_\_\_\_\_ 3  
years \_\_\_\_\_ 5 years \_\_\_\_\_ more than 5 years
15. What is your planning horizon for acquiring/purchasing stumpage?  
\_\_\_\_\_ 1 week \_\_\_\_\_ 1 month \_\_\_\_\_ 3 months \_\_\_\_\_ 6 months \_\_\_\_\_ 1 year \_\_\_\_\_ 3  
years \_\_\_\_\_ 5 years \_\_\_\_\_ more than 5 years \_\_\_\_\_ Not Applicable
16. What is your planning horizon for marketing your harvested timber (products)?  
\_\_\_\_\_ 1 week \_\_\_\_\_ 1 month \_\_\_\_\_ 3 months \_\_\_\_\_ 6 months \_\_\_\_\_ 1 year \_\_\_\_\_ 3  
years \_\_\_\_\_ 5 years \_\_\_\_\_ more than 5 years \_\_\_\_\_ Not Applicable
- NOTE: Q17 & Q18 may not be applicable, skip to 20**
17. How much lead-time do you typically receive prior to starting a harvest? \_\_\_\_\_
18. Is this enough time? \_\_\_\_\_ yes \_\_\_\_\_ no
19. If not how much would be acceptable?  
\_\_\_\_\_
20. How helpful the consumers in setting realistic production goals (**Choose only one**)?  
\_\_\_\_\_ not helpful \_\_\_\_\_ somewhat helpful \_\_\_\_\_ very helpful \_\_\_\_\_ indifferent
21. Do you think that consumers understand the affects that lost production has on your  
operation? \_\_\_\_\_ Yes \_\_\_\_\_ No
22. How do actions of consumers impact your ability to plan your operation?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
23. How much of your total time do you spend planning your harvesting operations?  
\_\_\_\_\_%

24. What do you spend your time planning time on (**Give percentages for each**)?  
 harvest scheduling \_\_\_\_\_  
 tract access \_\_\_\_\_  
 choice of logger \_\_\_\_\_  
 delivery of products \_\_\_\_\_  
 other ? \_\_\_\_\_
25. How do you allocate tracts to your loggers (**Choose only one**)?  
 \_\_\_\_\_ one at a time \_\_\_\_\_ group packages \_\_\_\_\_ semi - annual budgets \_\_\_\_\_ annual budgets \_\_\_\_\_ loggers locate own
26. What factors do you consider when assigning tracts to loggers (**Explain**)?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
27. How much lead time do you typically give your loggers prior to starting a tract (**Choose only one**)?  
 \_\_\_\_\_ less than one week \_\_\_\_\_ about one week \_\_\_\_\_ about one month \_\_\_\_\_ more than one month
28. What could be done to improve your current system of tract allocation?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## **PURCHASING**

29. How many product sorts do you deal with?  
 \_\_\_\_\_
30. What are the major factors that affect your actual logging cost?  
 \_\_\_\_\_  
 \_\_\_\_\_
31. Which of these factors are included in the negotiations to determine the cut and haul rate for a given tract?  
 \_\_\_\_\_  
 \_\_\_\_\_

32. When do you determine the cut and haul rate for a given tract?  
\_\_\_\_\_ less than one week \_\_\_\_\_ about one week \_\_\_\_\_ about one month \_\_\_\_\_  
more than one month

## SUPPLIERS

33. How many loggers do you work with? \_\_\_\_\_
34. What are the main criteria that you use to select loggers?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
35. How many of the loggers that you work with are considered preferred / core suppliers for a consumer? \_\_\_\_\_
36. Do you set production targets for your loggers? \_\_\_\_\_ yes \_\_\_\_\_ no
37. If yes, what is the time frame for these targets (**Choose all that apply**)?  
\_\_\_\_\_ daily \_\_\_\_\_ weekly \_\_\_\_\_ monthly \_\_\_\_\_ annually

## LOGGING

38. How many days of production do you lose a year due to weather related problems?  
\_\_\_\_\_
39. How often do you lose a day of production because of the consumer restriction (i.e. quota, mill shutdown)? \_\_\_\_\_ once a week \_\_\_\_\_ once a month \_\_\_\_\_ once every couple of months \_\_\_\_\_ twice a year \_\_\_\_\_ never
40. Aside from weather, what is the most common operational factor that limits your system? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
41. Do the loggers that you work with have additional production capacity?  
\_\_\_\_\_ felling \_\_\_\_\_ skidding \_\_\_\_\_ road construction \_\_\_\_\_ loading \_\_\_\_\_ processing  
\_\_\_\_\_ hauling
42. Why do logging contractors carry additional capacity?  
\_\_\_\_\_ market volatility \_\_\_\_\_ quotas \_\_\_\_\_ shutdowns \_\_\_\_\_ weather \_\_\_\_\_ other
43. What percentage of the time is your equipment not well suited to the tract that you are harvesting? \_\_\_\_\_

44. What percentage of the time do you have too much or not enough trucking capacity, and what are the main reasons for this? \_\_\_\_\_

\_\_\_\_\_

45. What do you personally think could be done in terms of planning and communication to make your job easier?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Consumer Questionnaire

1. What type of mill(s) do you procure for (**Give percentage for each**)?  
\_\_\_\_\_ hardwood lumber  
\_\_\_\_\_ pine lumber  
\_\_\_\_\_ chip-n-saw  
\_\_\_\_\_ paper mill  
\_\_\_\_\_ chip mill  
\_\_\_\_\_ oriented strand board  
\_\_\_\_\_ other (describe) \_\_\_\_\_
2. What are your main job responsibilities?  
\_\_\_\_\_  
\_\_\_\_\_
3. How many direct competitors do you have for timber in your region (**Choose only one**) \_\_\_\_\_ less than 5 \_\_\_\_\_ 5 – 10 \_\_\_\_\_ 10 – 20 \_\_\_\_\_ more than 20
4. What percentage of raw material comes from company owned land?  
\_\_\_\_\_  
\_\_\_\_\_
5. Are you responsible for procurement on?  
\_\_\_\_\_ both company and private \_\_\_\_\_ company only \_\_\_\_\_ private only
6. How many suppliers (loggers/dealers) do you personally work with?  
\_\_\_\_\_

### INVENTORY

7. How much raw material does the mill that you work for require per month?  
\_\_\_\_\_
8. How many days inventory of raw material does your main mill keep in the main wood yard (**Choose only one**)?  
\_\_\_\_\_ less than 5 days \_\_\_\_\_ 6 – 15 days \_\_\_\_\_ 16 – 30 days \_\_\_\_\_ more than 30 days
9. Does the mill have satellite yards where wood is stored? \_\_\_\_\_  
If yes how many? \_\_\_\_\_
10. How often does the consumption mix of the mill change (**Choose only one**)?  
\_\_\_\_\_ daily \_\_\_\_\_ weekly \_\_\_\_\_ monthly \_\_\_\_\_ semi – annually \_\_\_\_\_ annually

11. What causes the mill to change its consumption mix (**Rank by percentage**)  
 \_\_\_\_\_ different product run  
 \_\_\_\_\_ raw material change  
 \_\_\_\_\_ output demand change  
 \_\_\_\_\_ market change  
 \_\_\_\_\_ other (describe) \_\_\_\_\_
12. How much lead time do you get before the mill changes its raw material requirement needs (**Choose only one**)  
 \_\_\_\_\_ less than 1 week \_\_\_\_\_ 1 – 2 weeks \_\_\_\_\_ 2 – 4 weeks \_\_\_\_\_ more

## COMMUNICATION

13. On average, how often do you contact a supplier who you work with (**Choose only one**)?  
 \_\_\_\_\_ daily \_\_\_\_\_ 2 – 3 days \_\_\_\_\_ weekly \_\_\_\_\_ bi-weekly \_\_\_\_\_ monthly \_\_\_\_\_ never
14. On average, how often do suppliers who you work with contact you (**Choose only one**)?  
 \_\_\_\_\_ daily \_\_\_\_\_ 2 – 3 days \_\_\_\_\_ weekly \_\_\_\_\_ bi-weekly \_\_\_\_\_ monthly \_\_\_\_\_ never
15. How often do you communicate with private landowners (**Choose only one**)?  
 \_\_\_\_\_ daily \_\_\_\_\_ 2 – 3 days \_\_\_\_\_ weekly \_\_\_\_\_ bi-weekly \_\_\_\_\_ monthly \_\_\_\_\_ never
16. How good do think the information is that is exchanged between yourself and the loggers that work with you (**Use scale B**)?  
 \_\_\_\_\_ contract requirements  
 \_\_\_\_\_ harvest locations / layout  
 \_\_\_\_\_ mill shutdowns  
 \_\_\_\_\_ slow downs  
 \_\_\_\_\_ quota  
 \_\_\_\_\_ price  
 \_\_\_\_\_ market information  
 \_\_\_\_\_ other (**explain**) \_\_\_\_\_
17. How do you transfer information to loggers who you work with (**Choose all that apply**)?  
 \_\_\_\_\_ phone \_\_\_\_\_ personally \_\_\_\_\_ written \_\_\_\_\_ fax \_\_\_\_\_ notice \_\_\_\_\_ other

## PLANNING

18. What is the planning horizon for wood purchases in your organization?  
 \_\_\_\_\_ 1 week \_\_\_\_\_ 1 month \_\_\_\_\_ 1 quarter \_\_\_\_\_ 6 months \_\_\_\_\_ 1 year \_\_\_\_\_  
 3 years \_\_\_\_\_ 5 years \_\_\_\_\_ more than 5 years

19. How involved is the logger in determining the (**Use scale A**)

\_\_\_\_\_ location of the tract  
\_\_\_\_\_ layout of the tract  
\_\_\_\_\_ access of the tract  
\_\_\_\_\_ time of harvest  
\_\_\_\_\_ delivery of products

20. How much time do you spend on the following (**Use scale A**)?

\_\_\_\_\_ location of timber  
\_\_\_\_\_ tract layout  
\_\_\_\_\_ harvest scheduling  
\_\_\_\_\_ access planning  
\_\_\_\_\_ choice of logger  
\_\_\_\_\_ delivery of products

21. How do you allocate tracts to your loggers/dealers (**Choose only one**)?

\_\_\_\_\_ as needed \_\_\_\_\_ one at a time (but prior to completion of current sale)  
\_\_\_\_\_ group packages \_\_\_\_\_ semi - annual budgets \_\_\_\_\_ annual budgets

22. Who determines tract allocation procedures (**Choose only one**)?

\_\_\_\_\_ forester \_\_\_\_\_ landowner \_\_\_\_\_ consumer

23. How much lead-time does a logger get when a tract is allocated to him?

\_\_\_\_\_ less than one week \_\_\_\_\_ one week \_\_\_\_\_ one month \_\_\_\_\_ more than one month

24. What could be done to improve your current tract allocation system?

\_\_\_\_\_  
\_\_\_\_\_

## **PURCHASING**

25. What are the major factors that affect the actual logging cost of your producers/loggers?

\_\_\_\_\_  
\_\_\_\_\_

26. Which of these factors are included in the negotiations to determine the cut and haul rate for a given tract?

\_\_\_\_\_  
\_\_\_\_\_

27. Who is responsible for negotiating the logging rate?

\_\_\_\_\_ wood dealer \_\_\_\_\_ company forester \_\_\_\_\_ landowner \_\_\_\_\_ other

28. When is the cut and haul rate negotiated for a given tract (**Choose only one**)?  
       \_\_\_\_\_ long before harvest starts \_\_\_\_\_ immediately prior to start \_\_\_\_\_ at the start  
       \_\_\_\_\_ after the start
29. Who determines how and where secondary products (i.e. peelers) will be marketed?  
       \_\_\_\_\_ self \_\_\_\_\_ forester \_\_\_\_\_ wood dealer \_\_\_\_\_ landowner \_\_\_\_\_ consumer
30. How are secondary markets selected?  
       \_\_\_\_\_ cost \_\_\_\_\_ availability \_\_\_\_\_ distance \_\_\_\_\_ economic feasibility \_\_\_\_\_ specs

## SUPPLIERS

31. How does your company / mill choose its suppliers (loggers/dealers)?  
       \_\_\_\_\_  
       \_\_\_\_\_  
       \_\_\_\_\_  
       \_\_\_\_\_
32. How many suppliers does your mill currently use? \_\_\_\_\_
33. Could the mill use less suppliers than what it is currently? \_\_\_\_\_  
       Why \_\_\_\_\_ aren't \_\_\_\_\_ they  
       \_\_\_\_\_
34. Does this company / mill operate a preferred / core supplier system?  
       \_\_\_\_\_ yes \_\_\_\_\_ no (**if no skip to question 38**)
35. What differentiates a preferred / core supplier from another supplier?  
       \_\_\_\_\_ cost \_\_\_\_\_ quality \_\_\_\_\_ productivity \_\_\_\_\_ operability \_\_\_\_\_ public relations  
       \_\_\_\_\_ communication \_\_\_\_\_ BMPs \_\_\_\_\_ safety
36. How many preferred / core suppliers does the mill have (**Choose only one**)?  
       \_\_\_\_\_ 1 – 5, \_\_\_\_\_ 6 – 10, \_\_\_\_\_ 11 – 20 \_\_\_\_\_ more than 20
37. Do you help set production targets for your suppliers? \_\_\_\_\_ yes \_\_\_\_\_ no
38. If yes, what is the time frame for these targets (**Choose all that apply**)?  
       \_\_\_\_\_ daily \_\_\_\_\_ weekly \_\_\_\_\_ monthly \_\_\_\_\_ annually
39. If no, why not? \_\_\_\_\_  
       \_\_\_\_\_  
       \_\_\_\_\_
40. How often are the targets evaluated? \_\_\_\_\_
41. What information is used to determine the production targets?  
       \_\_\_\_\_

## LOGGING

42. In what areas do logging contractors in your region carry additional capacity (**Choose all that apply**)?

\_\_\_\_\_ felling \_\_\_\_\_ skidding \_\_\_\_\_ road construction \_\_\_\_\_ loading \_\_\_\_\_ hauling  
\_\_\_\_\_ processing

43. Why do logging contractors carry additional capacity (**Choose all that apply**)?

\_\_\_\_\_ market volatility \_\_\_\_\_ quotas \_\_\_\_\_ shutdowns \_\_\_\_\_ weather \_\_\_\_\_ lack of  
labor \_\_\_\_\_ other (describe)

44. What percentage of the time is the harvesting system not well suited to the tract that is being harvested (i.e. mismatched)?

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45. How many different types of logging systems are within the procurement area for this mill, what is the operability and what are the limiting factors of each?

|                                          |                                                                                 |                                                                                 |                                                                                 |                                                                                 |                                                                                 |
|------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Equipment Mix                            |                                                                                 |                                                                                 |                                                                                 |                                                                                 |                                                                                 |
| Operability (months)                     |                                                                                 |                                                                                 |                                                                                 |                                                                                 |                                                                                 |
| Limiting factor<br>( <b>Circle one</b> ) | Weather<br>Topography<br>Timber type<br>Timber size<br>Ground<br>water<br>Other | Weather<br>Topography<br>Timber type<br>Timber size<br>Ground<br>water<br>Other | Weather<br>Topography<br>Timber type<br>Timber size<br>Ground<br>water<br>Other | Weather<br>Topography<br>Timber type<br>Timber size<br>Ground<br>water<br>Other | Weather<br>Topography<br>Timber type<br>Timber size<br>Ground<br>water<br>Other |

46. For what other systems do you see a need for in your area?

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47. What advantage would this 'other' system capture?

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48. What do you personally think could be done in terms of planning and communication to make your job easier?

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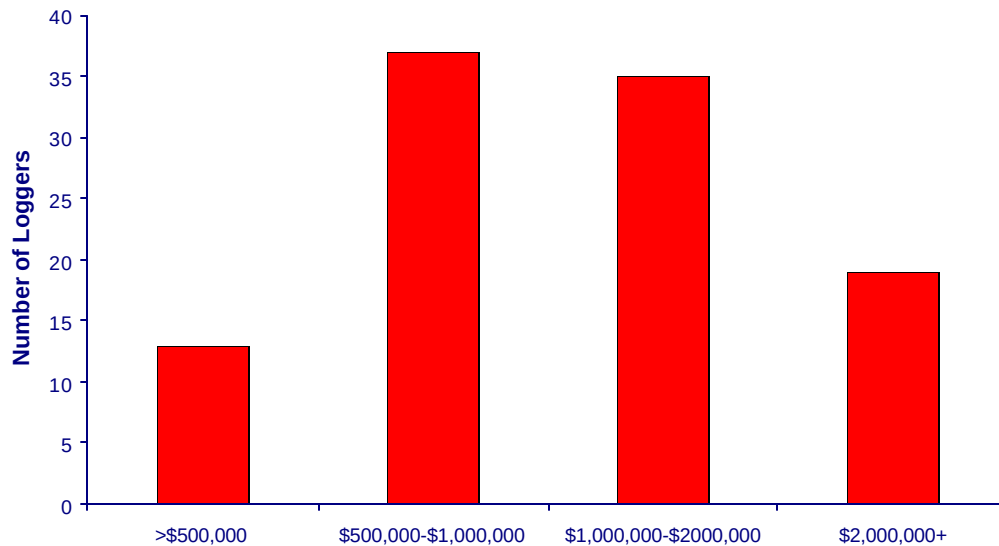
## Graphed Questionnaire Results

### Logger Questionnaire

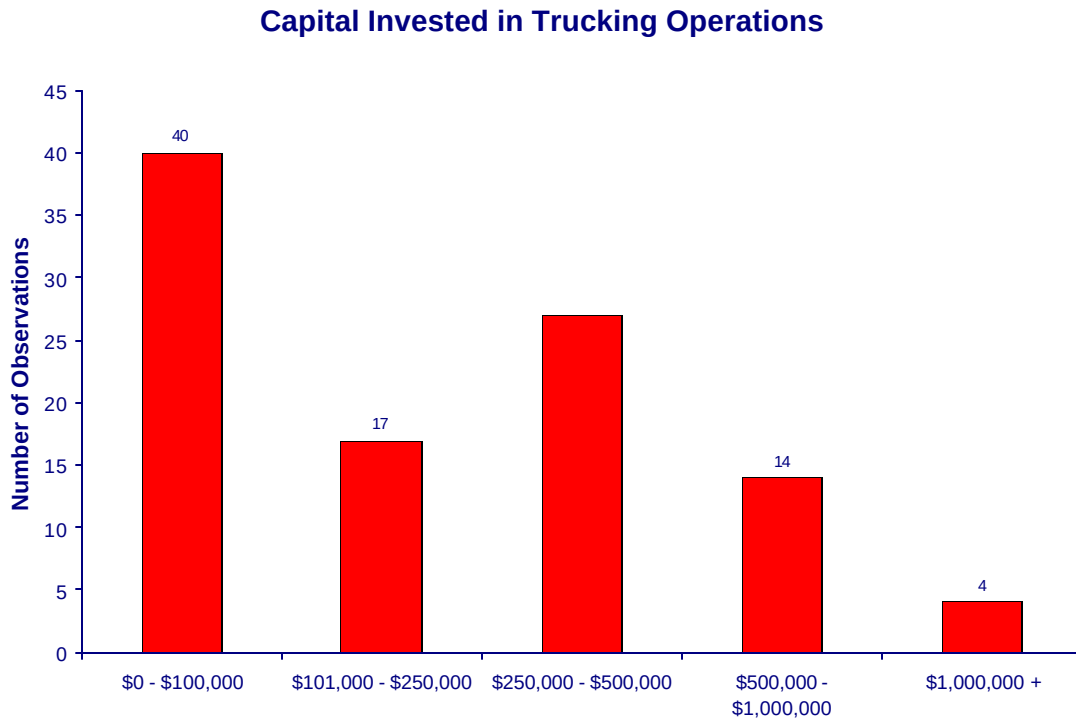
#### SYSTEM ATTRIBUTES

1. Describe your logging system (**List specific equipment**).  
Felling \_\_\_\_\_ Age \_\_\_\_\_  
Skidding \_\_\_\_\_ Age \_\_\_\_\_  
Loading \_\_\_\_\_ Age \_\_\_\_\_  
Road Building \_\_\_\_\_ Age \_\_\_\_\_  
Processing \_\_\_\_\_ Age \_\_\_\_\_  
Hauling \_\_\_\_\_ Age \_\_\_\_\_
2. If you had to replace all the in woods equipment on your job with new machines, what would it cost?

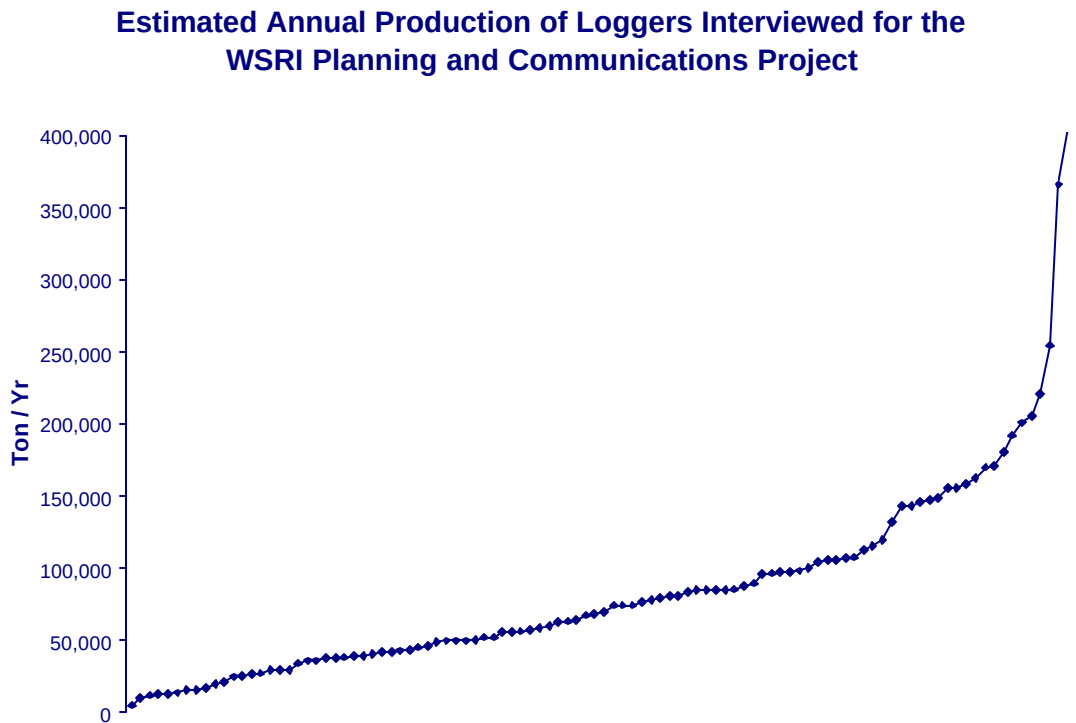
#### Capital Investment of Loggers Involved with WSRI Planning and Communications Study



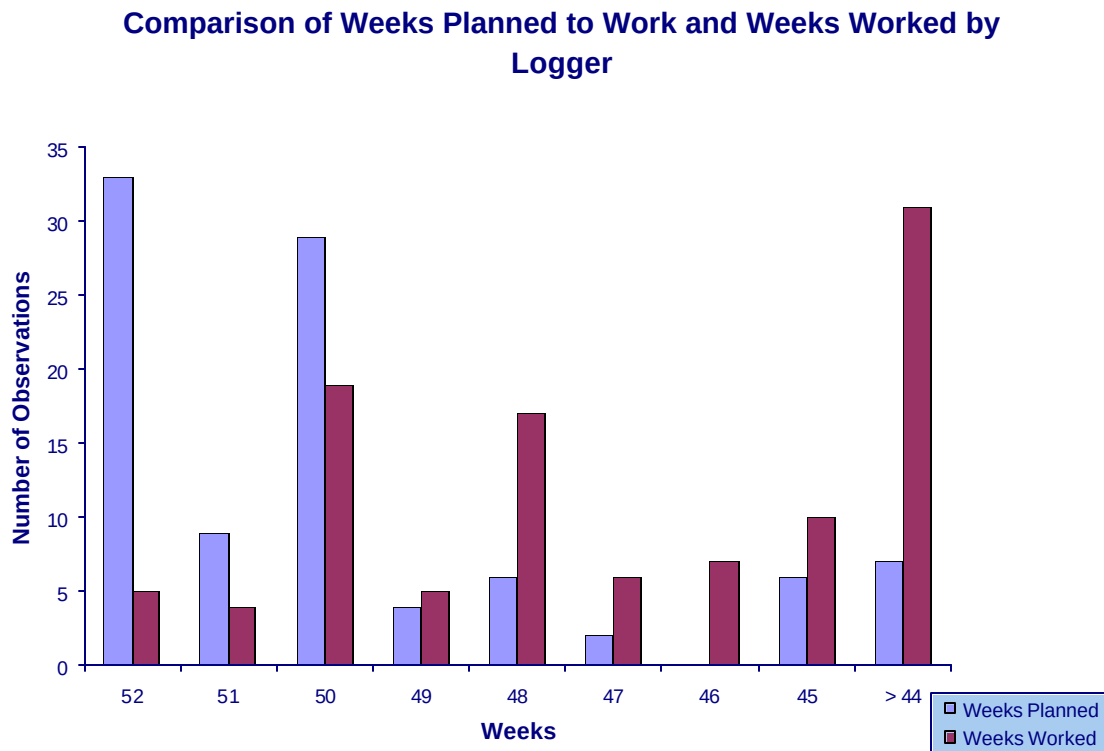
3. How much money have you got tied up in trucks?



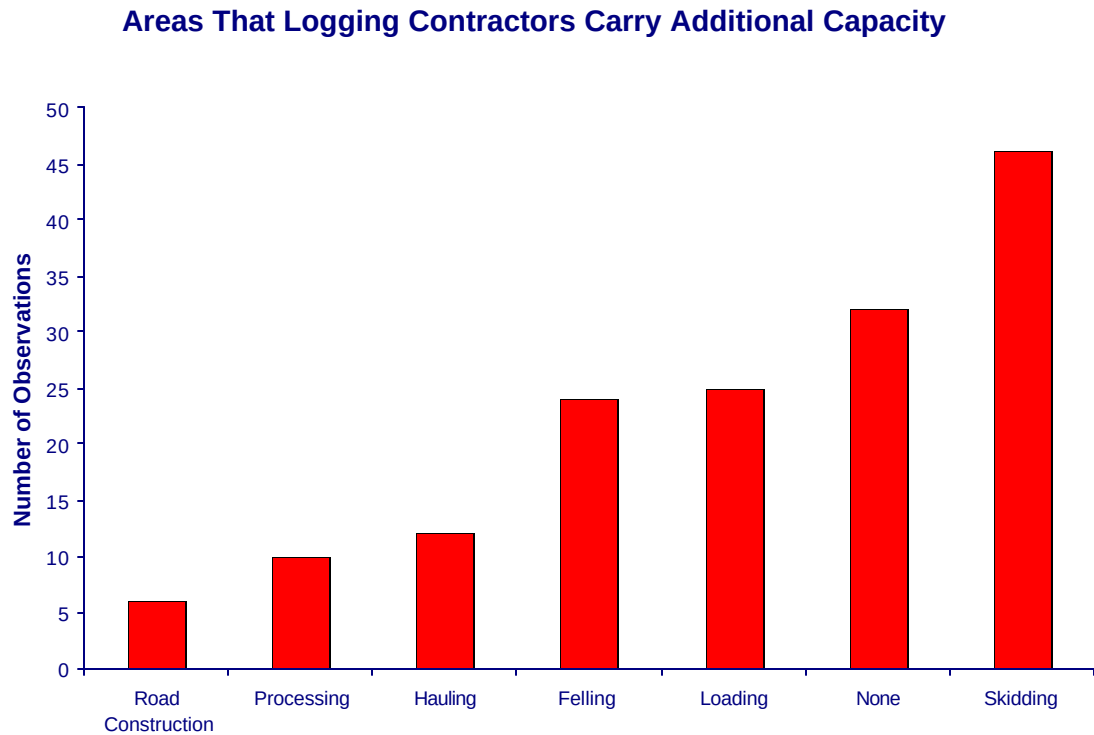
4. How many tons do you produce a week on average?



5. How many weeks per year do you plan to work and how many weeks do you work?

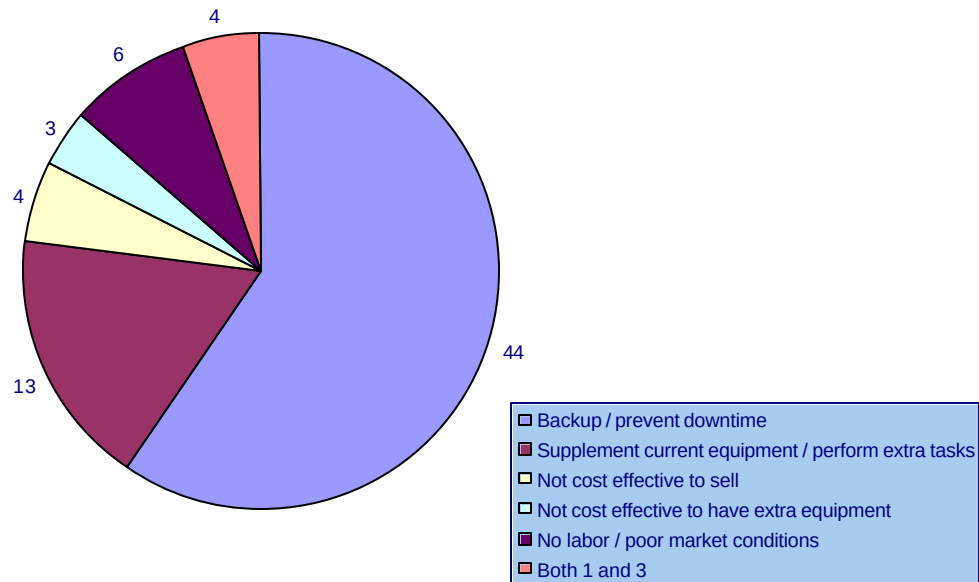


6. Do you have any extra or 'backup' equipment?



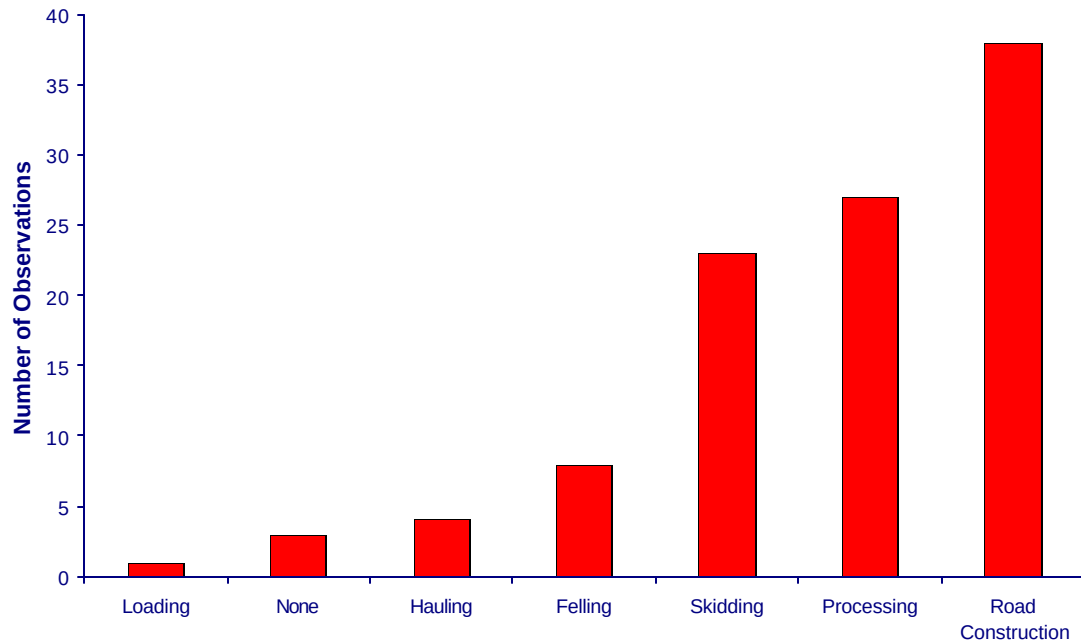
7. Why?

**Reasons Why Logging Contractors Carry Extra Equipment**



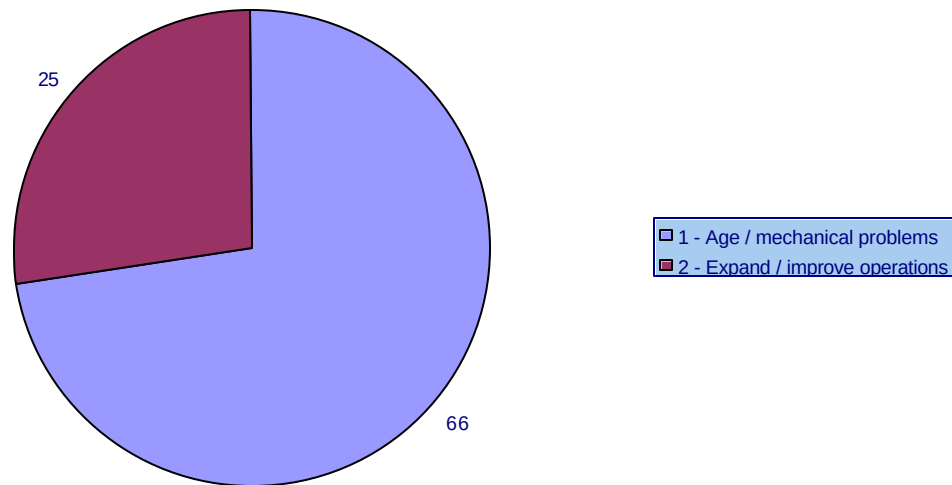
8. If you could replace one machine on this operation, which would it, be?

**Piece of Equipment Most Likely to Be Replaced**



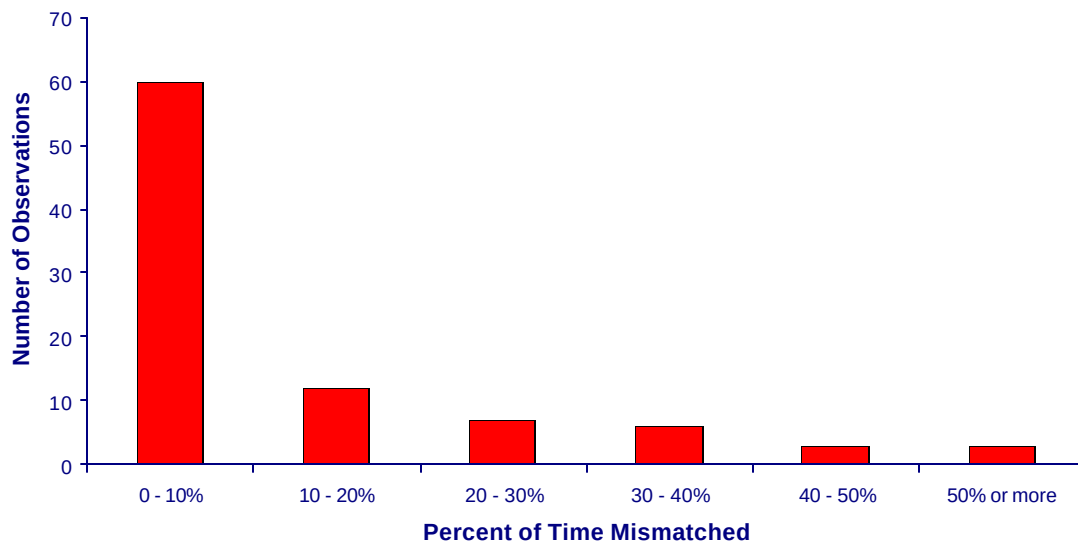
Why? \_\_\_\_\_

### Reason's Why Logging Contractors Replace Equipment

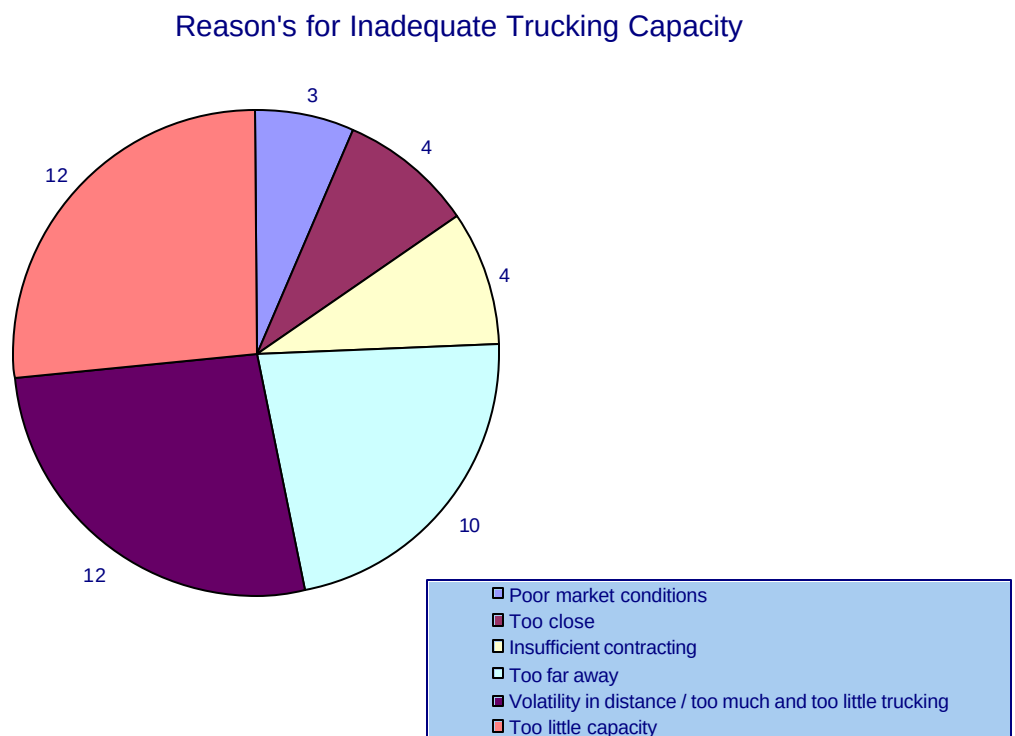
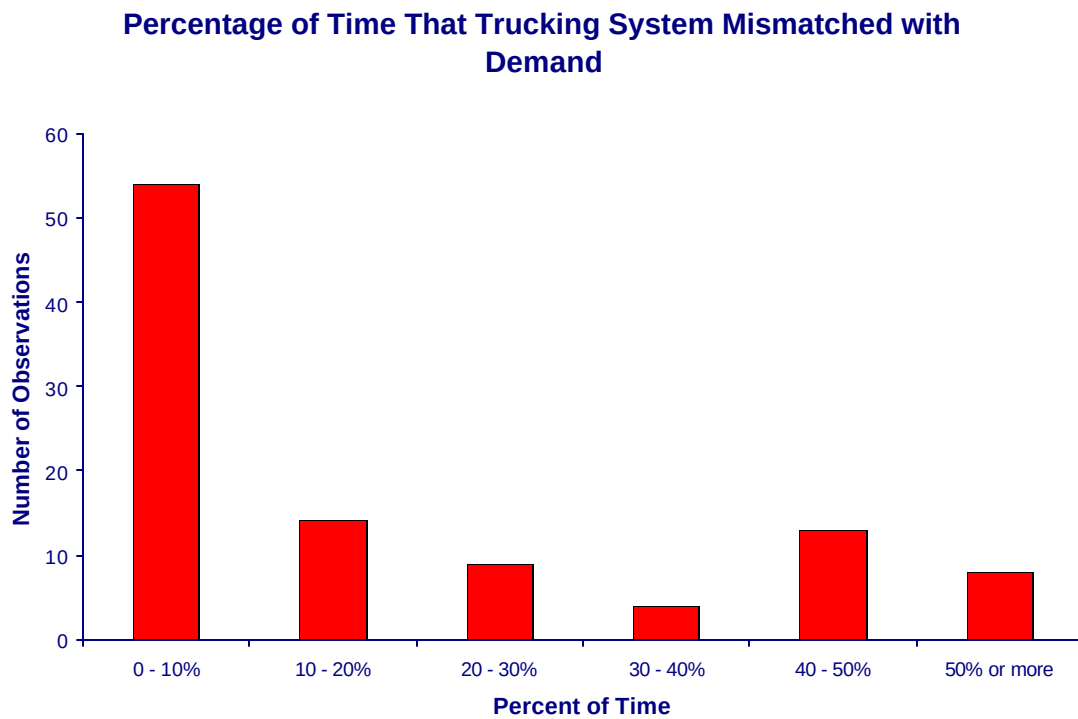


9. What percentage of the time is your equipment spread not well suited for the tract that you are harvesting?

### Percentage of Overall Time That Harvest System is Mismatched to Timber



10. What percentage of the time do you have too much or not enough truck capacity?

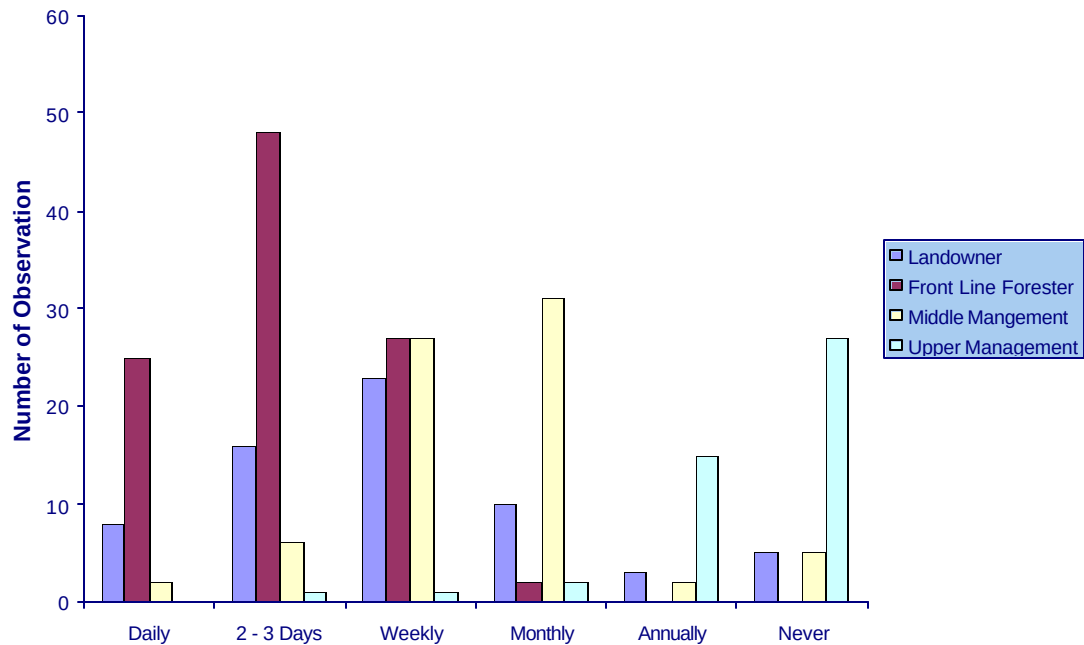


11. What do you think would be an ideal harvesting system for your area?

## COMMUNICATION

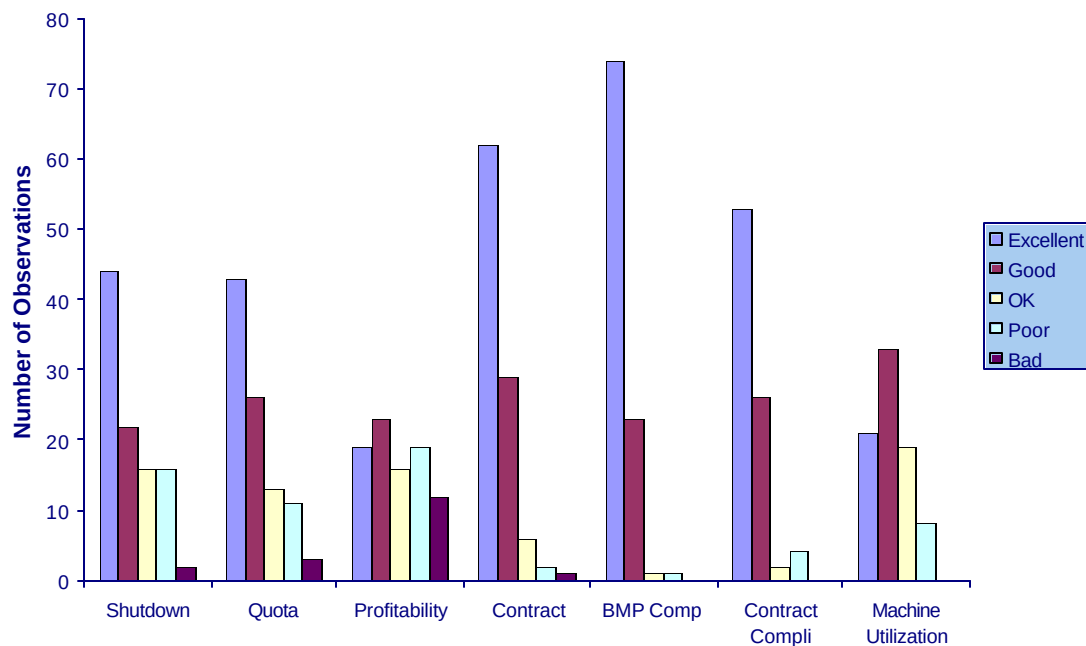
12. How often do you talk business with:

**Frequency of Communication**



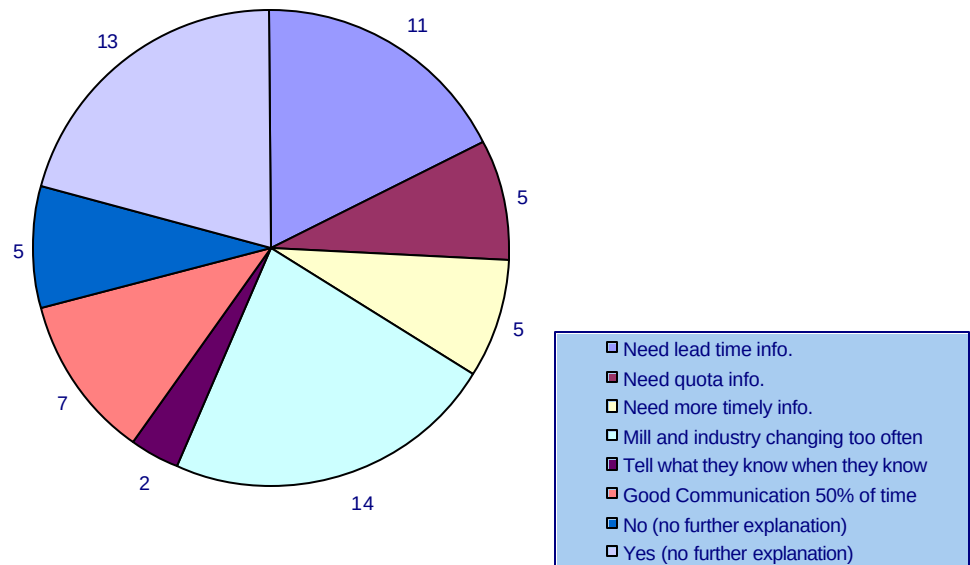
13. How would you rate the exchange of information related to?

**Rating of Quality of Informaiton**



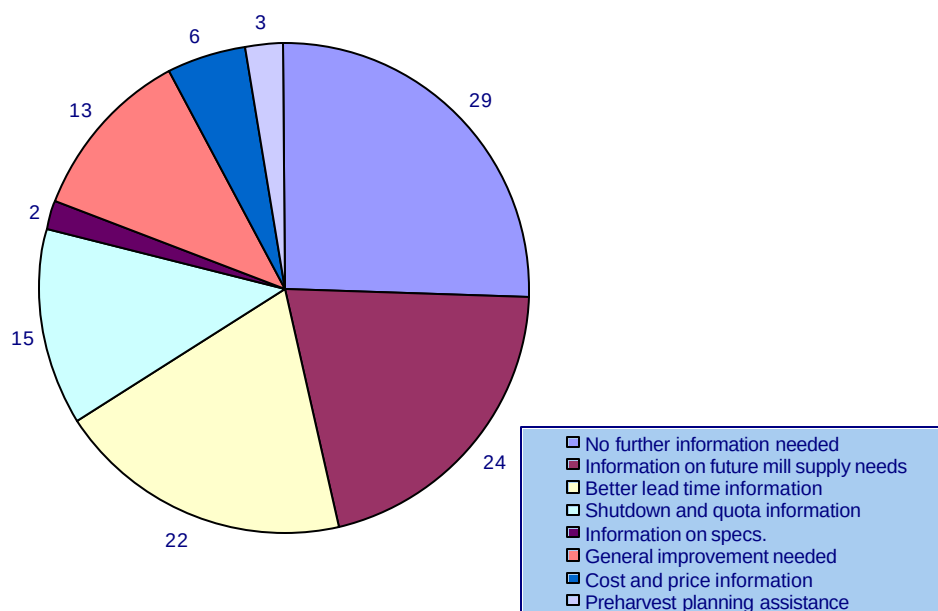
14. Do you feel that you receive enough information in a timely manner from the mills that you supply to adequately plan your operation?

#### Is Enough Information Received in A Timely Manner



15. For the mills you supply, what additional information could they provide to improve your ability to plan?

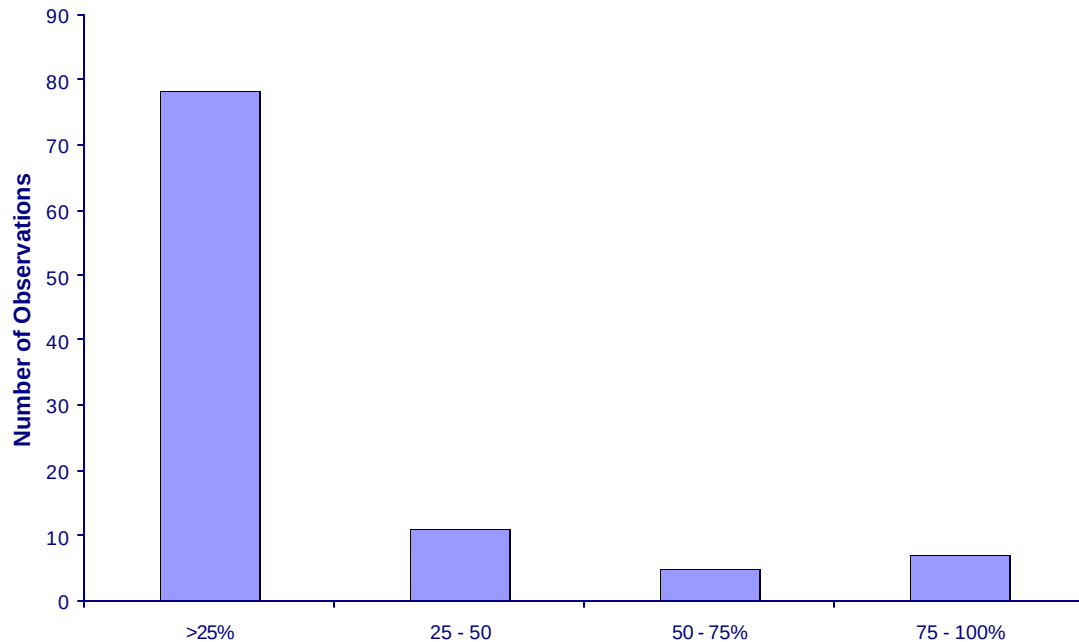
#### Additional Information That Consumers Could Provide



## PLANNING

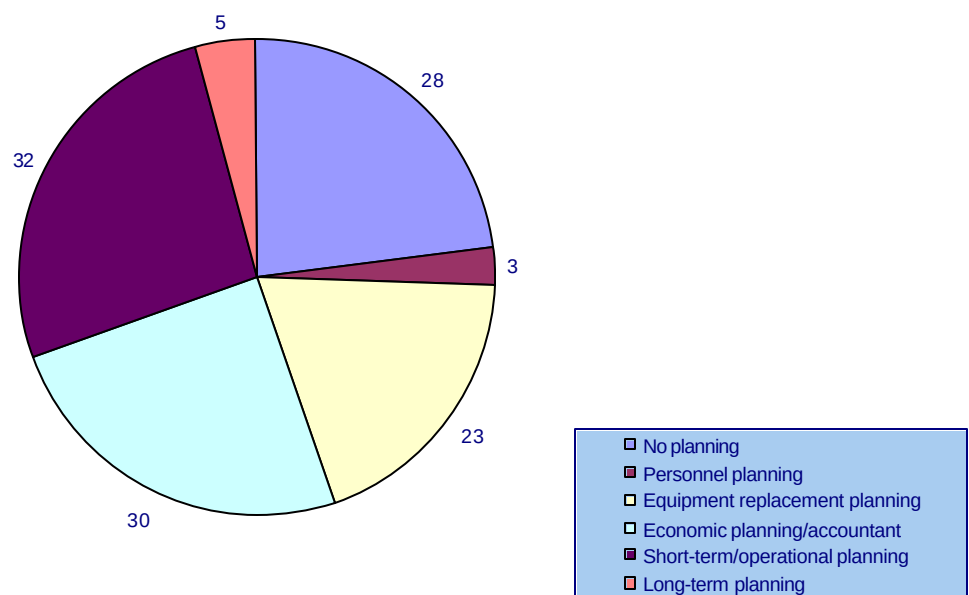
16. What percentage of the timber you harvest do you buy yourself?

**Percentage of Timber Purchased by Logger**



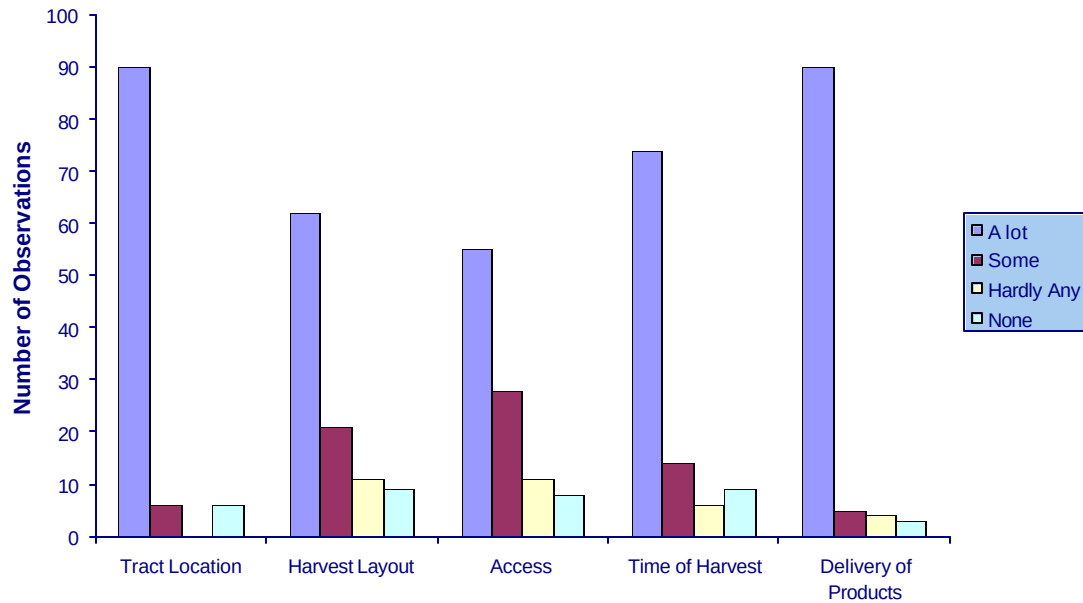
17. What kind of planning do you do for your logging business and on average what % of your time do you spend on planning?

**Type of Long Term Planning Performed by Logger**



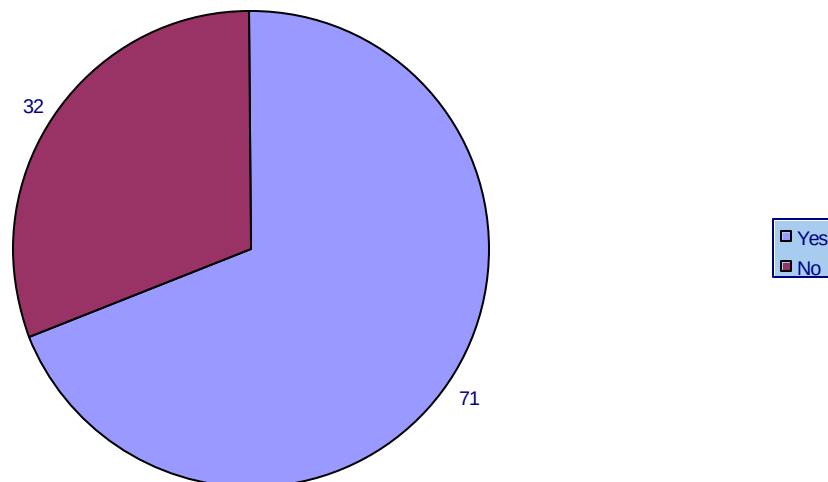
18. How involved is the company (dealer) in planning for your business?

**How Involved Are Consumers / Dealers in Planning for Logging Business**



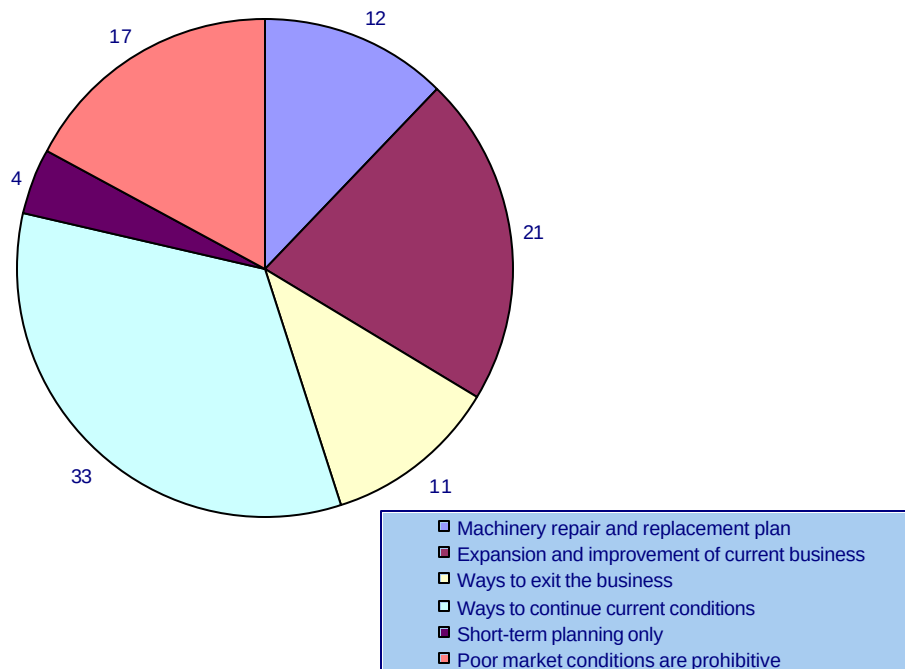
19. Do you have a long-term plan for the growth and improvement of your logging business?

**Loggers Who Have a Long Term Plan For Their Business**



20. If yes, what does it involve? If no, why not?

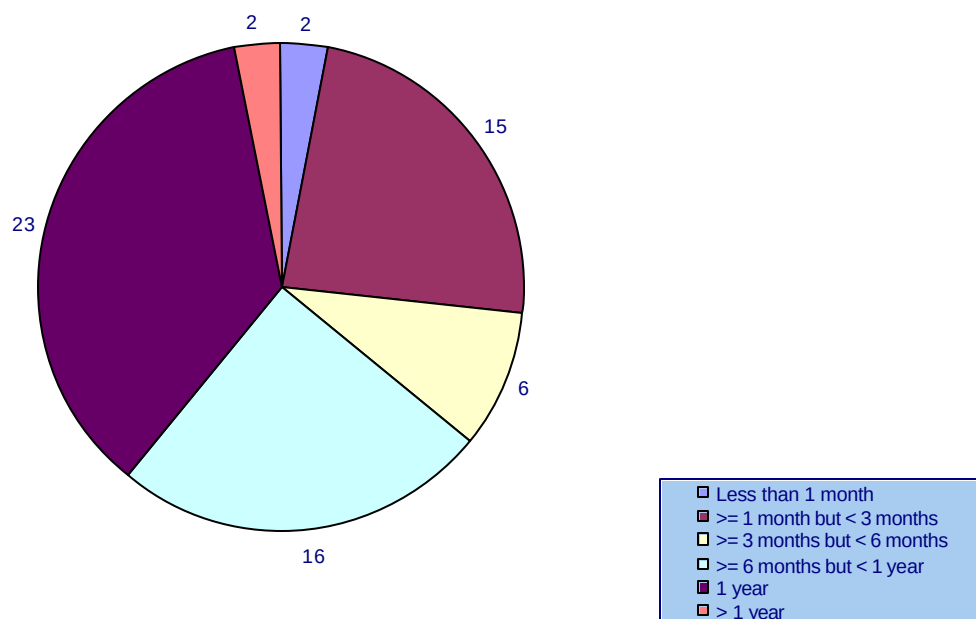
**What Does Long Term Planning Involve**



21. If you buy your own stumpage, how much stumpage do you usually keep ahead?

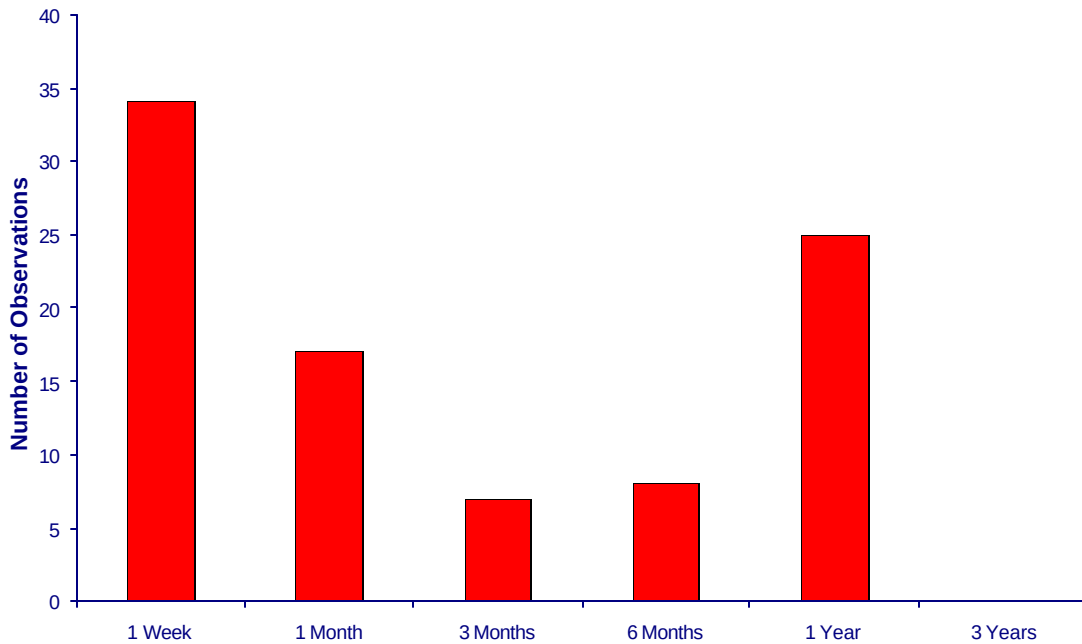
22. To optimize your operation how much timber do you need to have purchased in advance?

**How Much Timber is Needed in Advance**



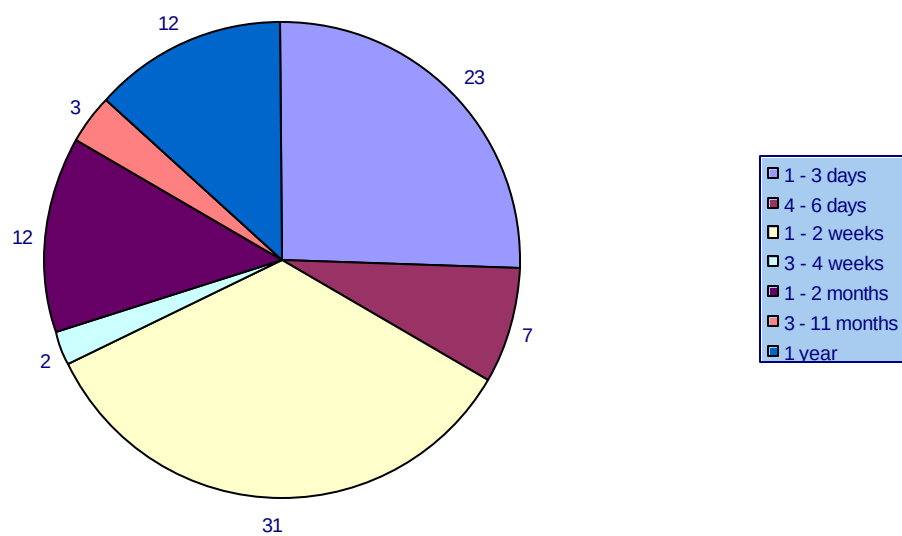
23. How far ahead do you know where you will be selling your timber (categorized by product)?

**Timeframe Where Markets Are Known**



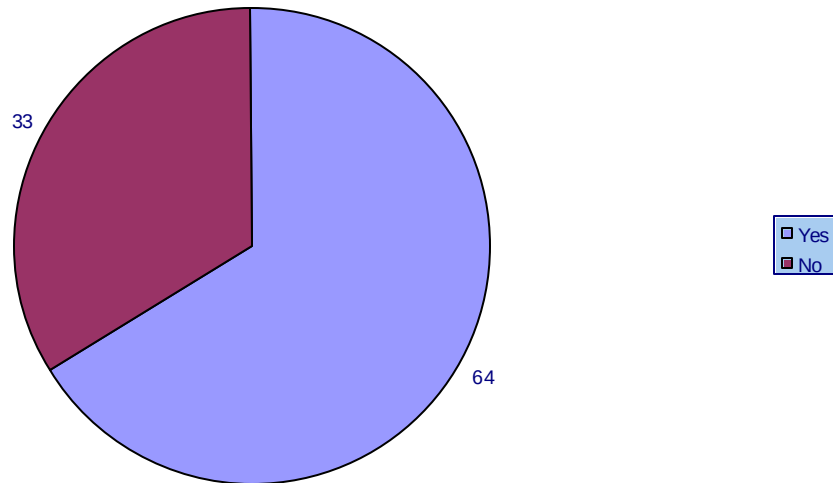
24. If stumpage is provided for you, how much notice do you get before moving to a tract?

**How Much Lead Time is Given Before Moving to a Tract**



25. Is this enough time?

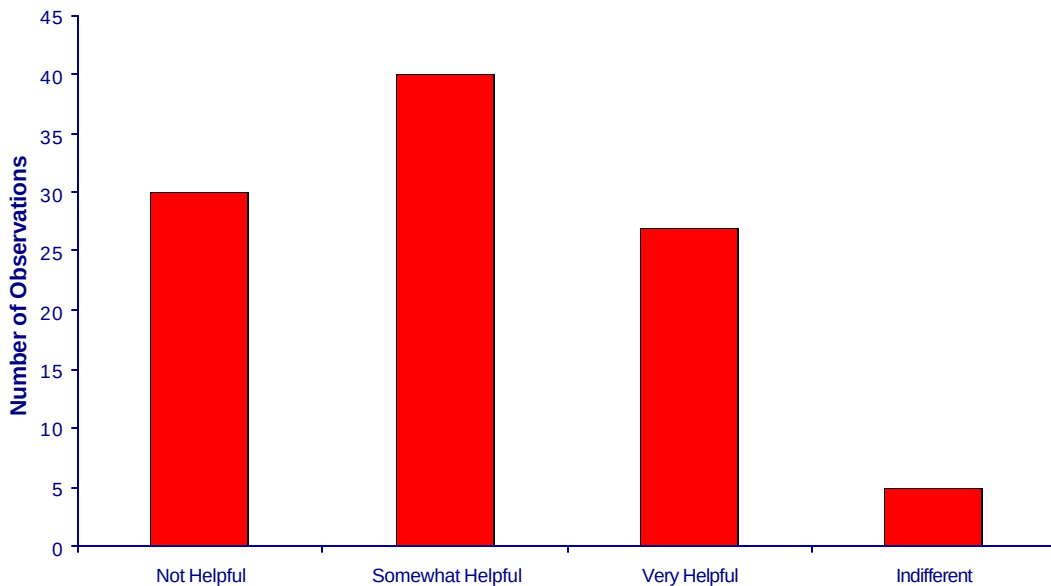
### Is Lead Time Adequate for Planning



26. If not, why not, and how much lead-time would be acceptable?

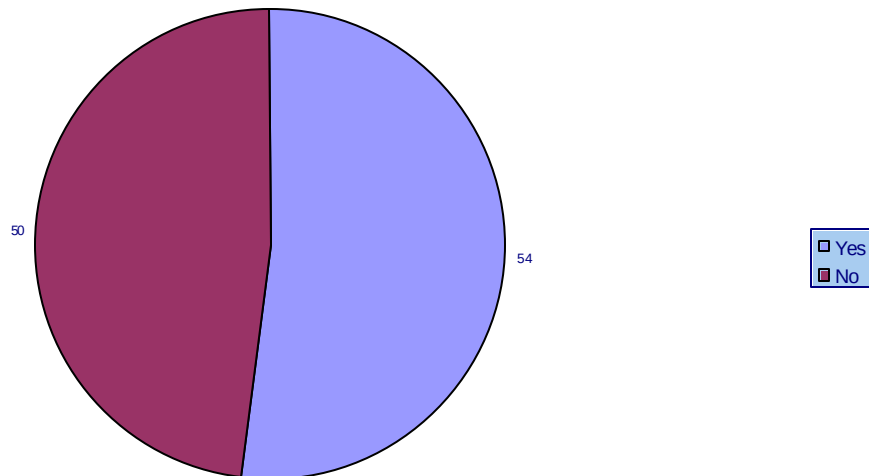
27. How helpful are the mills (or dealer) you log for in helping your operation set realistic production goals?

### How Helpful Are Consumers in Setting Realistic Production Goals for an Operation



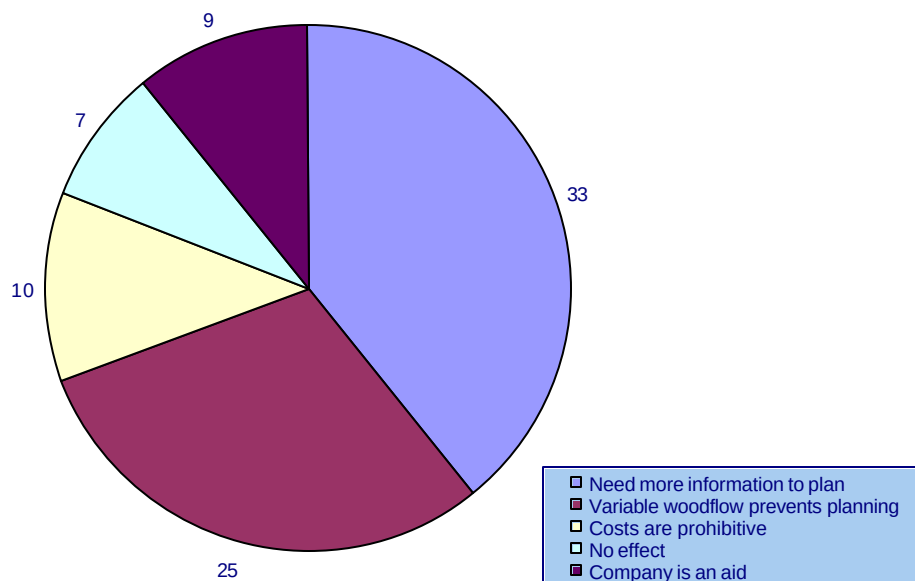
28. Do you think that the mills (dealers) understand the effects that lost production has on your operation?

**Do You Believe Consumers Understand the Affects of Lost Production**



29. How do actions of the consumer / mill impact your ability to plan for your operation?

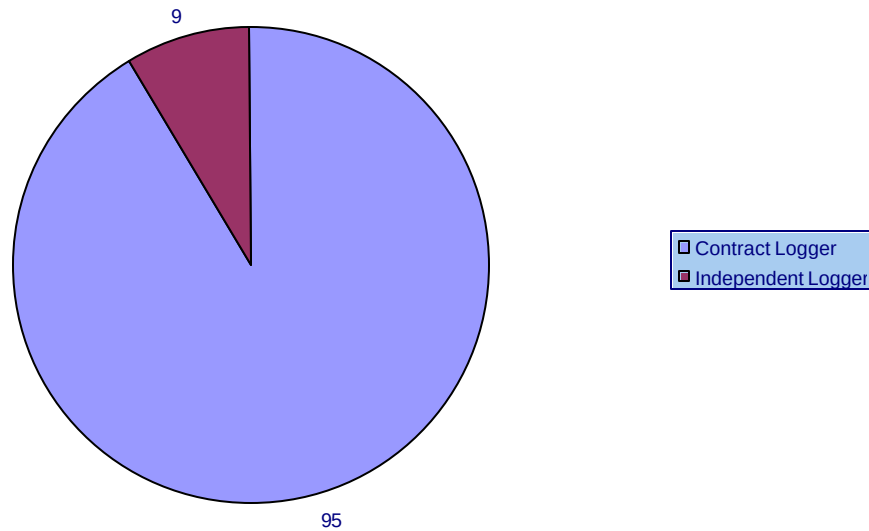
**How Actions of Mill / Consumer Impact Ability to Plan**



## PURCHASING

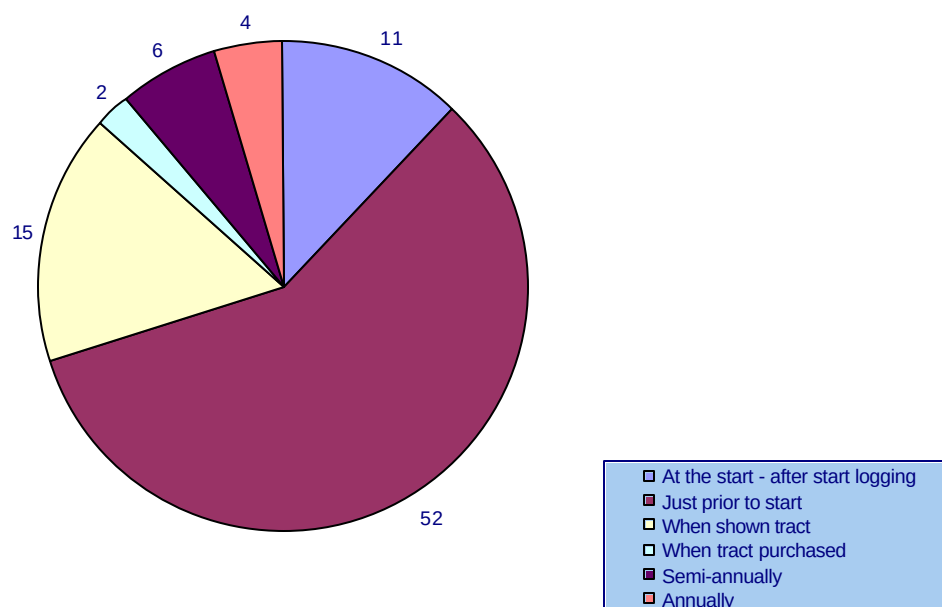
30. Do you generally log for a forest products company or wood dealer, or do you buy your own stumpage and market it independently?

**Types of Logger Interviewed**



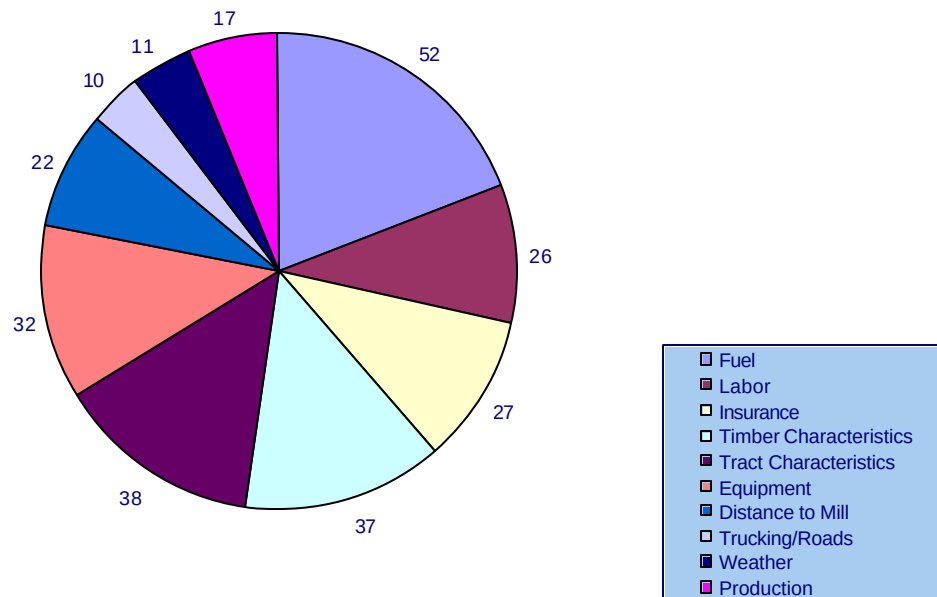
31. When is the compensation (cut and haul rate) for a tract typically determined?

**When is Compensation Typically Determined**



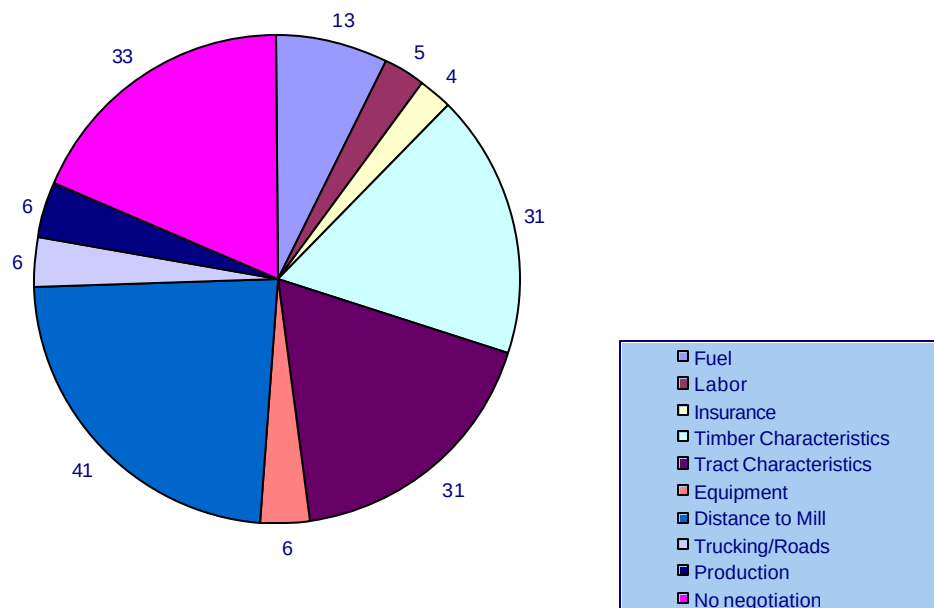
32. What are the major factors that affect your logging cost?

**Major Factors That Affect Logging Cost**



33. Which of these factors are included in the negotiations to determine the cut and haul rate for a given tract?

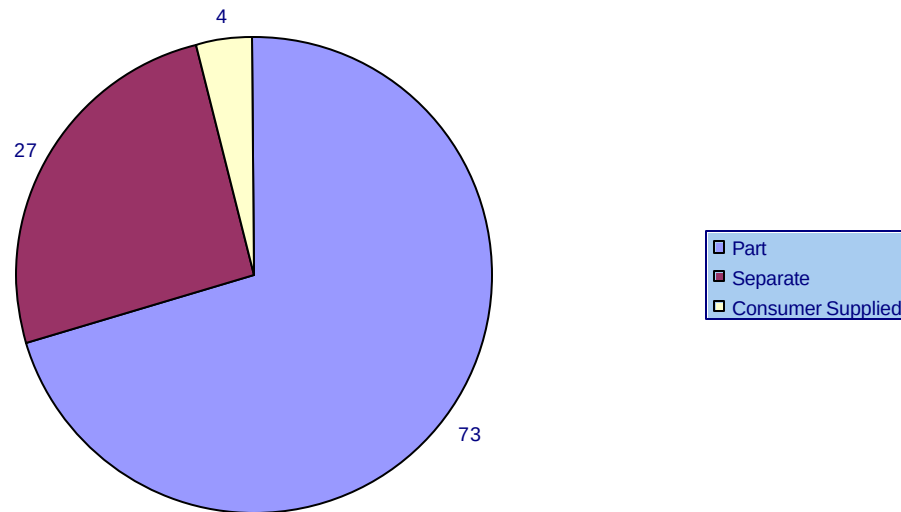
**Factors Included in Negotiations for Cut and Haul Rate**



34. How is the timber that you produce hauled?

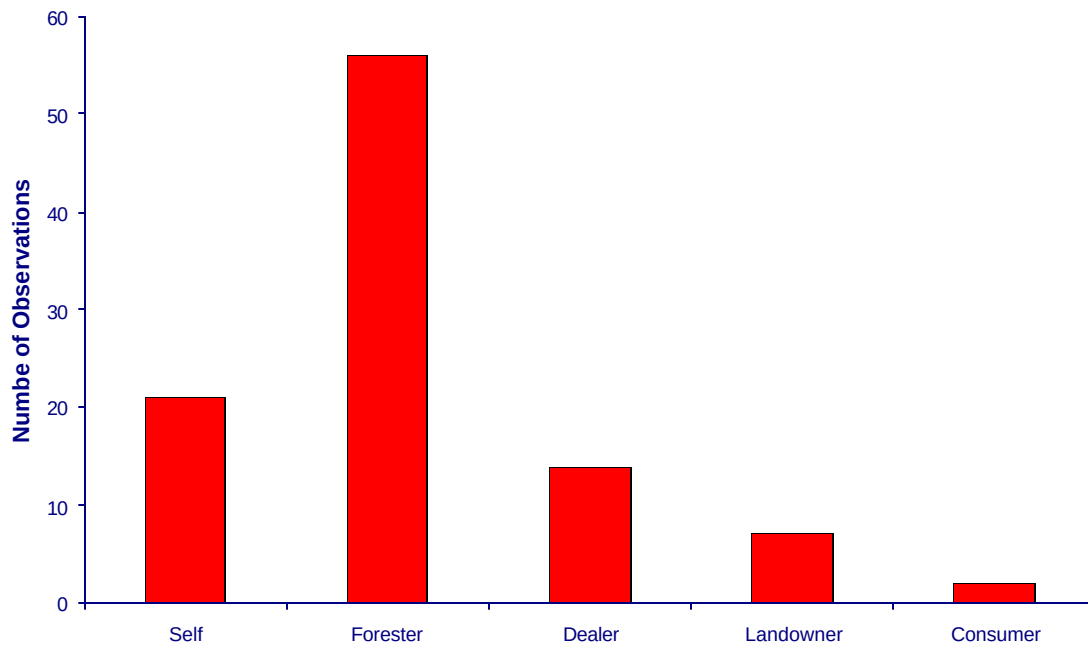
35. How are paid for trucking?

**How is Trucking Paid For**

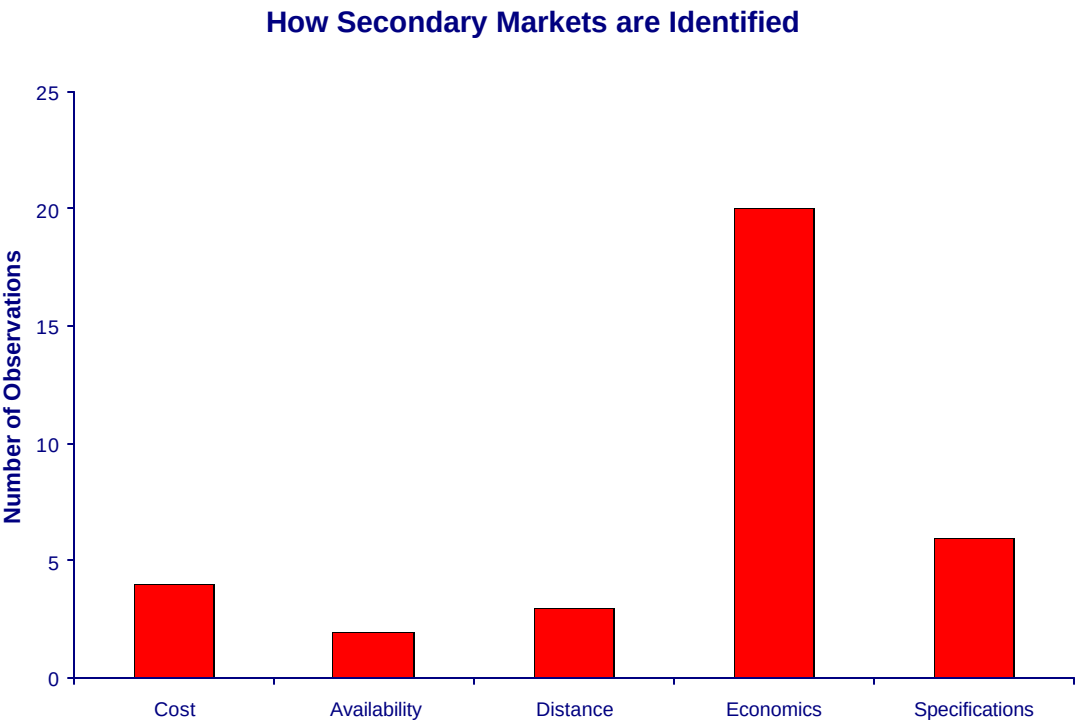


36. Who determines how and where secondary products (i.e. peeler logs) will be marketed?

**Who Determines Secondary Product Marketing**

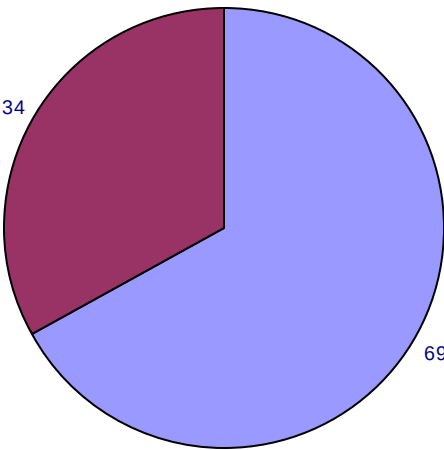


37. How are secondary markets selected?



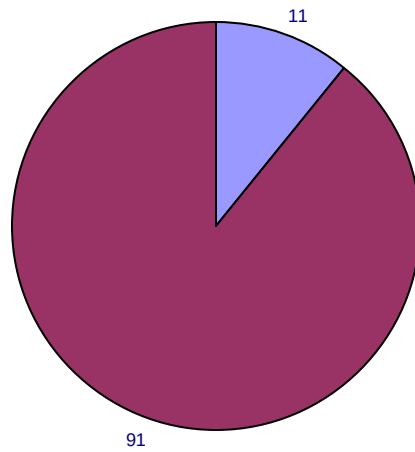
38. Are you a preferred / core supplier of any company?

**Number of Respondants Who Were Considered Cores Suppliers**



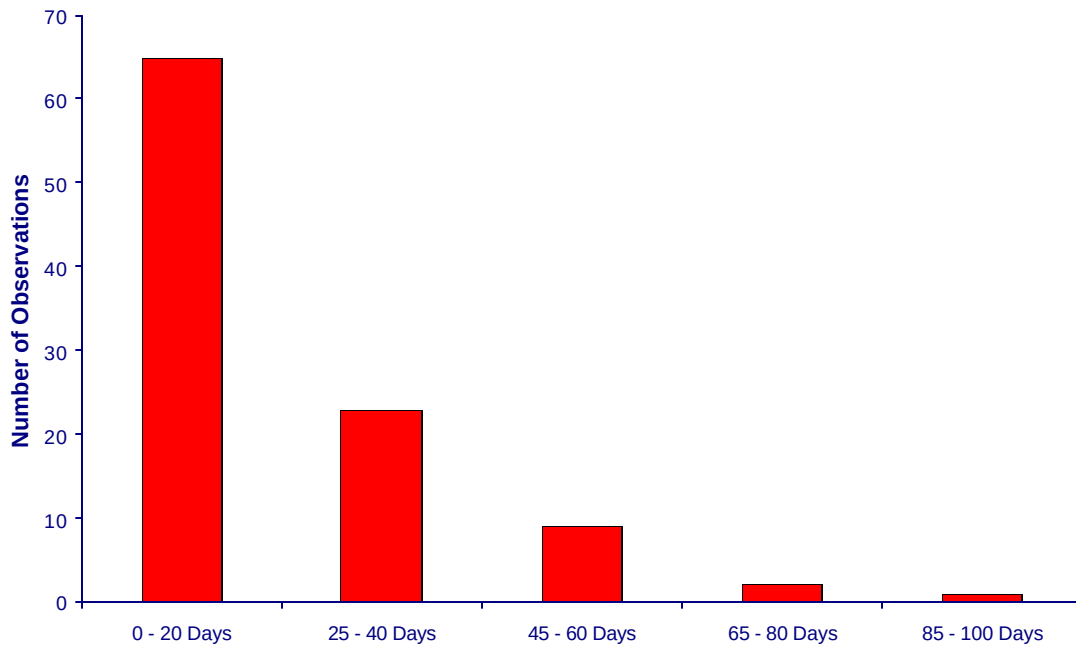
39. Are you a preferred / core supplier for more than one company?

**Number of Respondants Who Were Considered Core Suppliers to More than One Consumer**



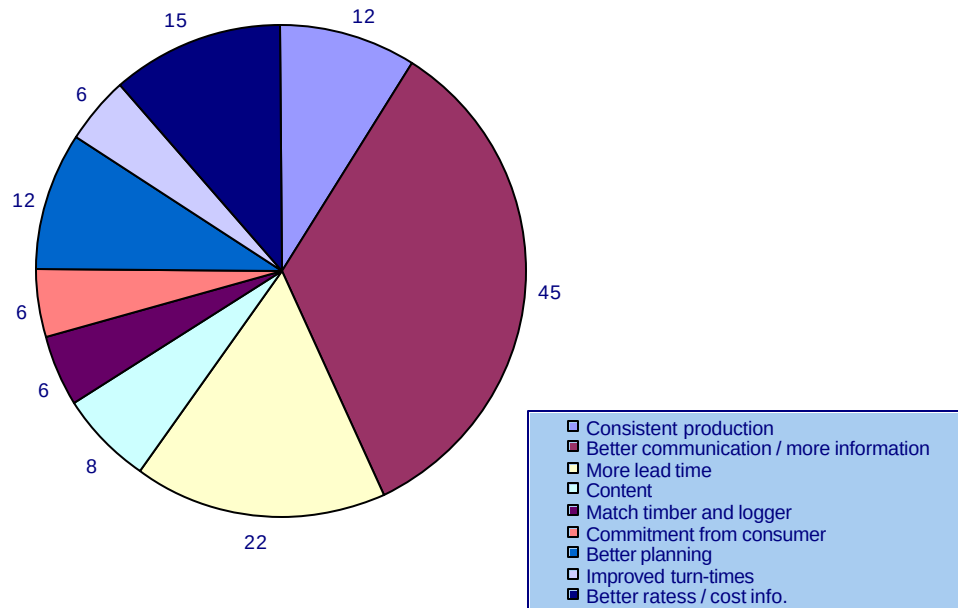
40. How many days per year do you lose to weather related downtime?  
41.

**Number of Days Lost Per Year Due to Weather**



42. What do you personally think could be done in terms of planning and communication to make your job easier?

**What Could Be Done to Improve Your Ability to Plan**

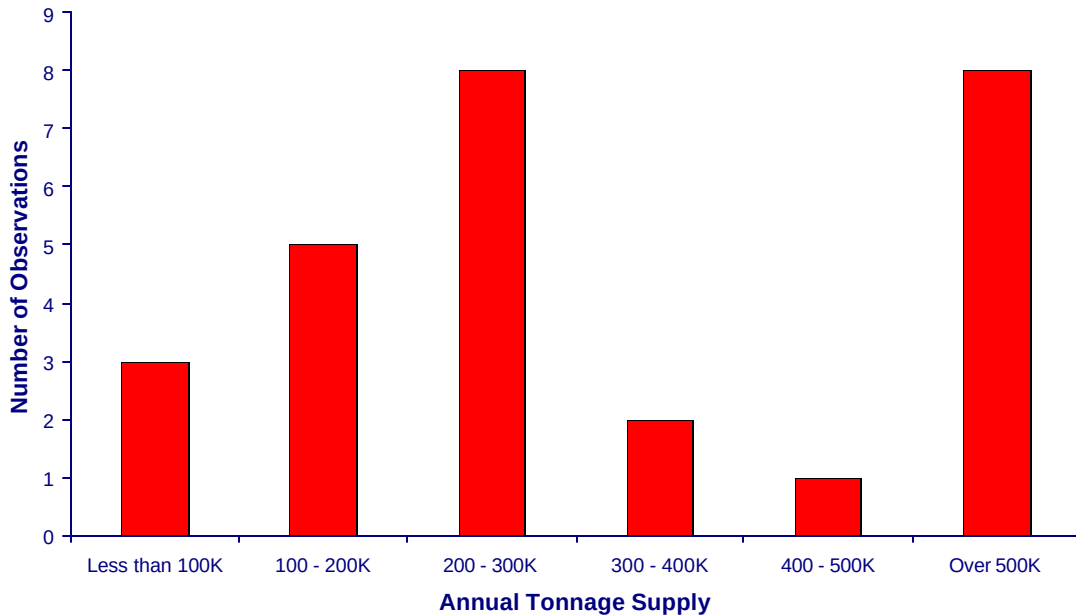


## Wood Dealer Questionnaire

### GENERAL

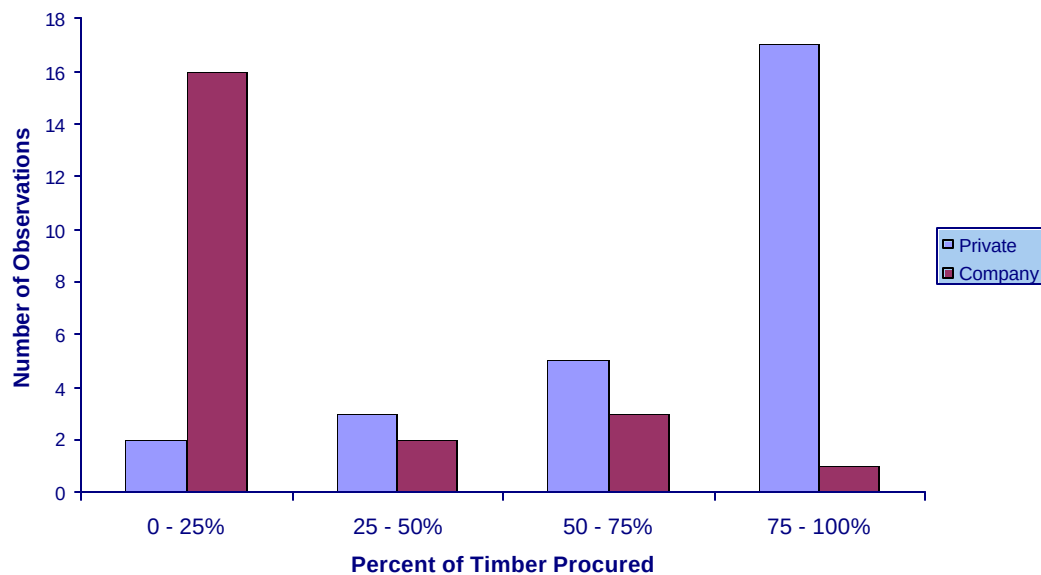
1. How many tons of wood do you supply annually?

**Annual Supply Levels for Wood Dealers Surveyed**



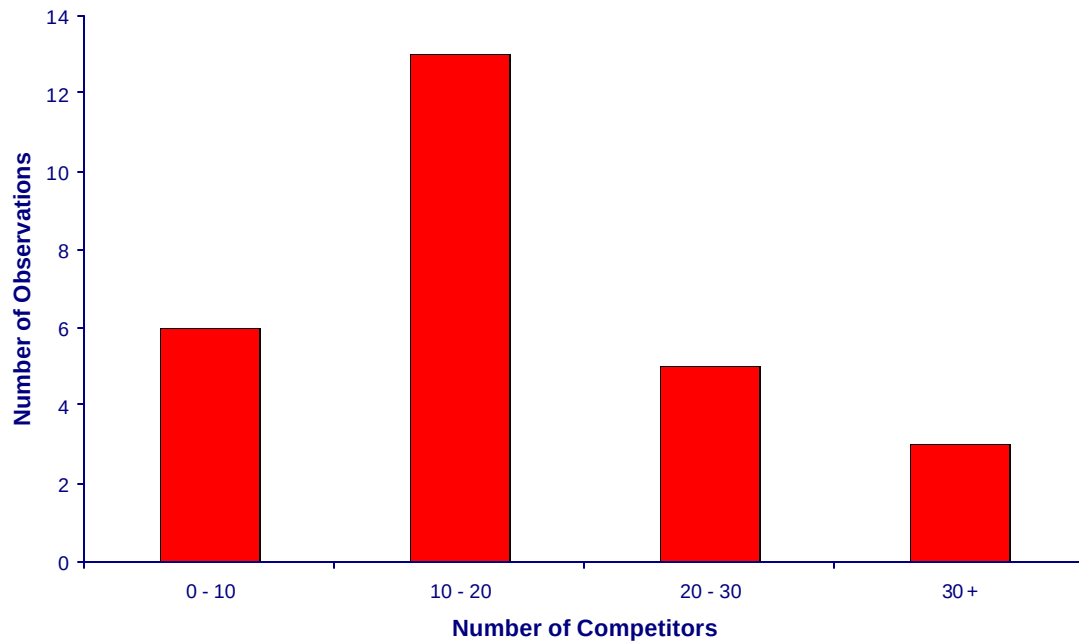
2. What percentage of the timber that you harvest is

**Breakdown of Company Versus Private Stumpage Procurement by Delaers**



3. How many loggers / wood dealers do you compete within your region ?

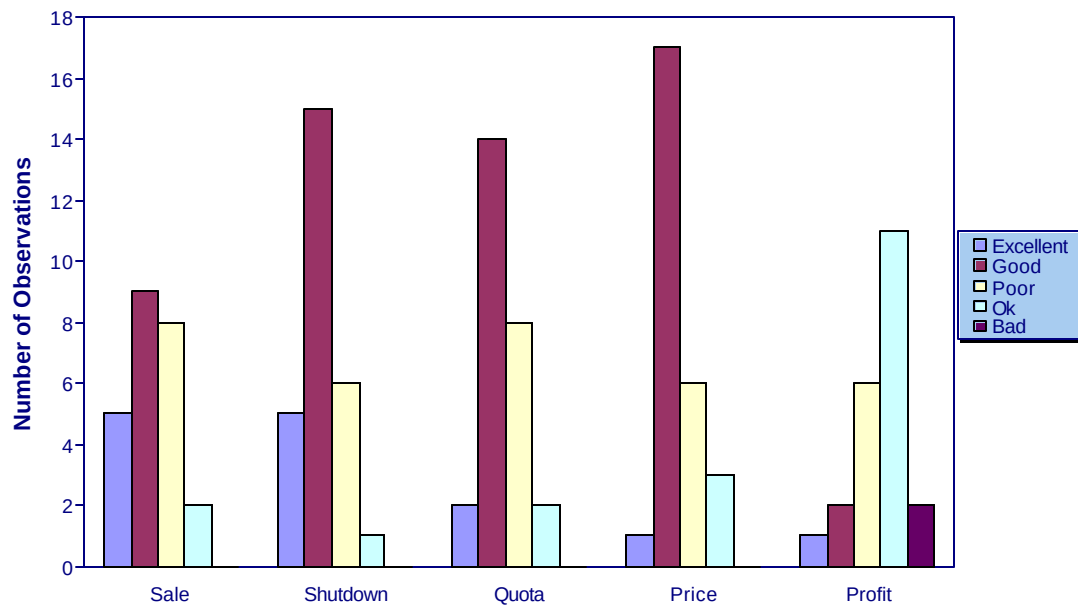
**Number of Competitors Within Dealers Region**



## COMMUNICATION

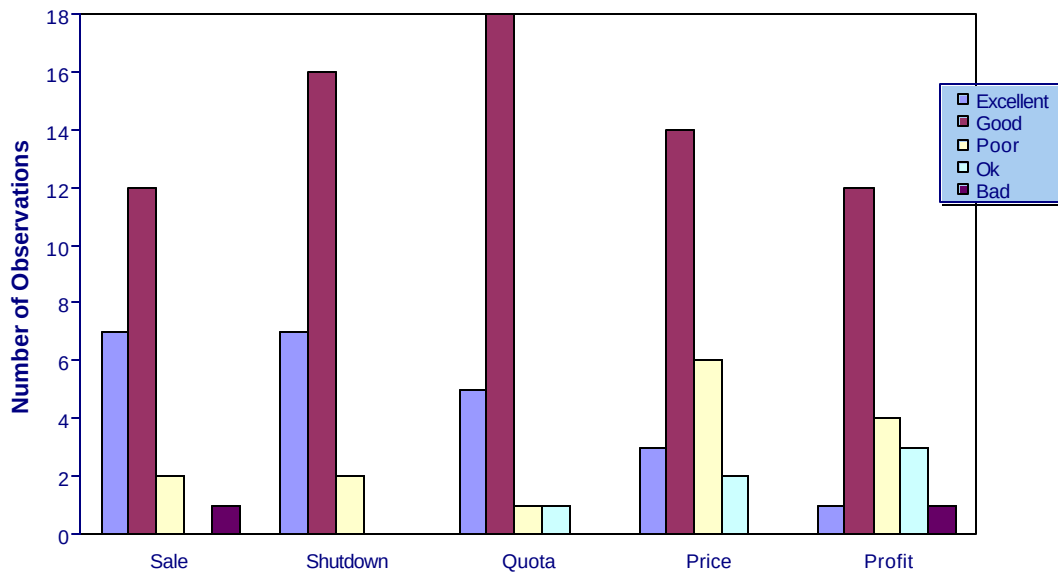
4. What quality of information is exchanged between yourself and the consumer?

**Quality of Information Exchanged Between Dealer and Consumer**



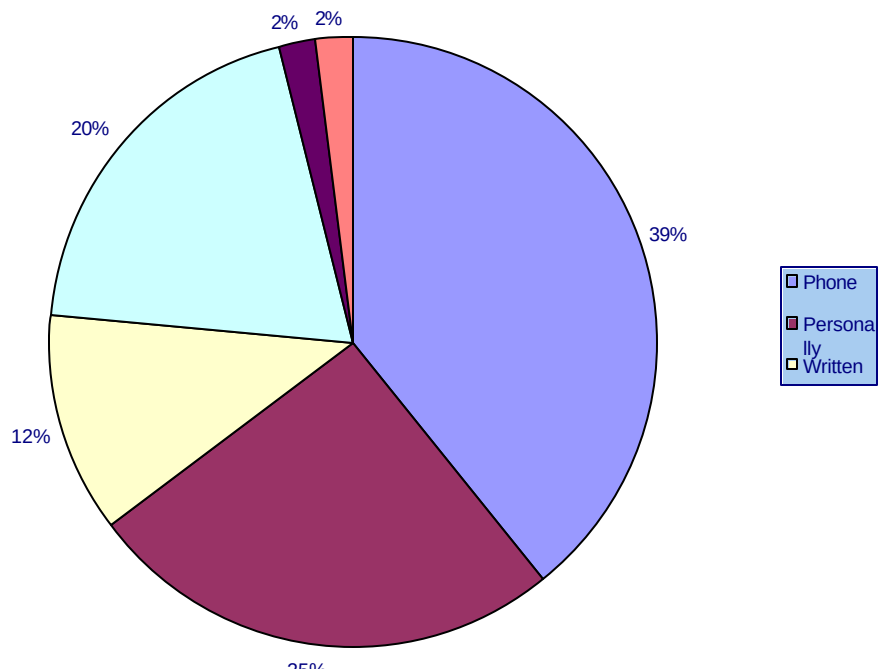
5. What quality of information is exchanged between yourself and the logger?

**Quality of Information Exchanged Between Dealer and Logger**



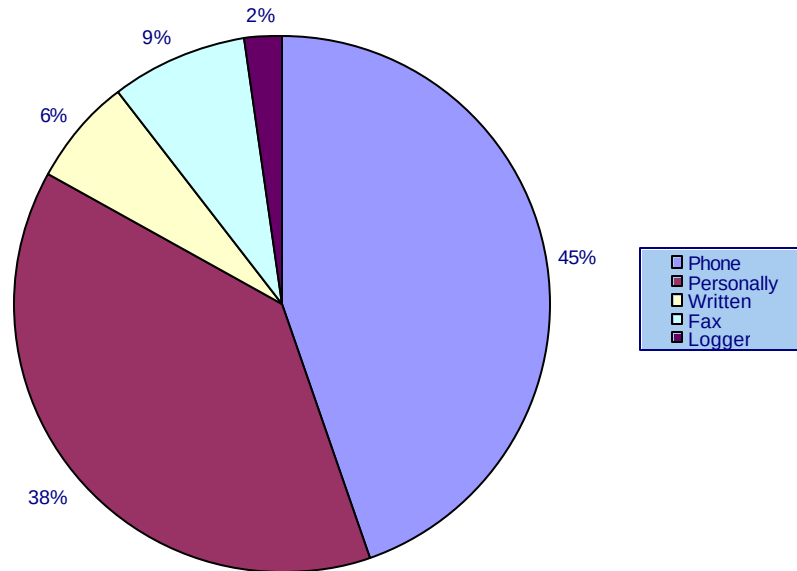
6. How do you receive information about market changes from the consumer?

**Method of Information Transfer to the Dealer**



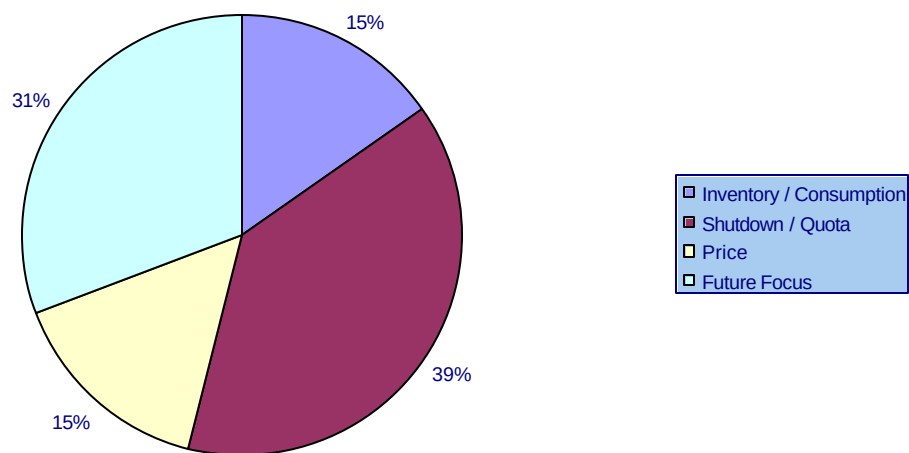
7. How do you pass information about market changes to your loggers?

**How Information is Transferred from Dealer to Logger**



8. For the mills you supply, what information could they provide to improve your ability to plan?

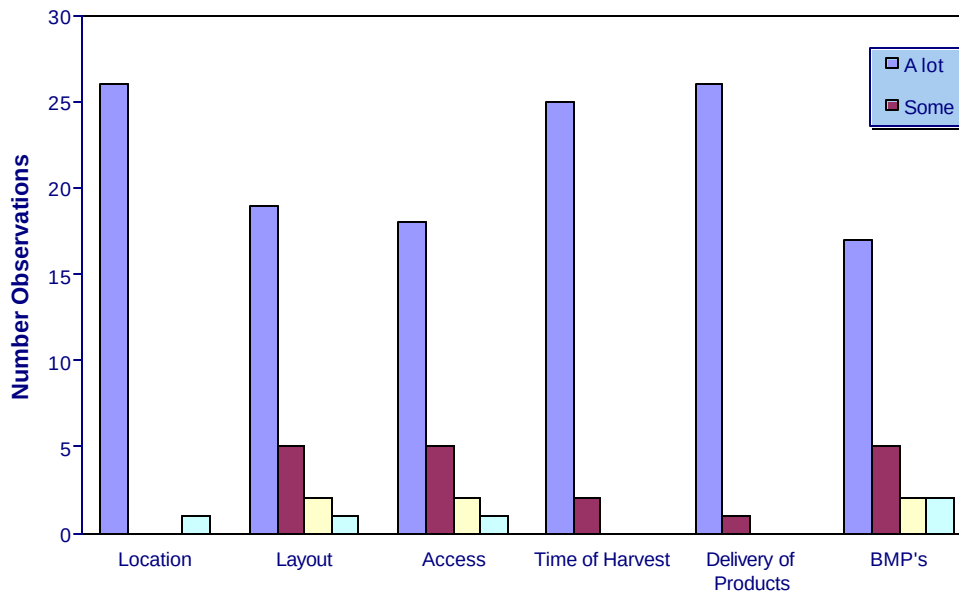
**Information Mills Could Supply to Improve Wood Dealers' Ability to Plan**



## PLANNING

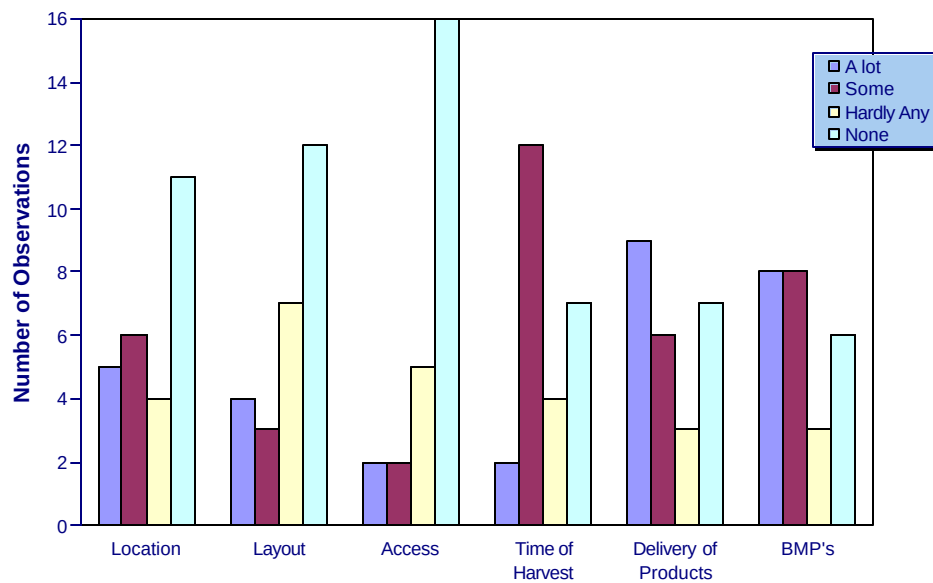
9. How involved are you in planning of the activities listed below for loggers that you work with?

**Involvement of Dealers in Planning for Loggers**



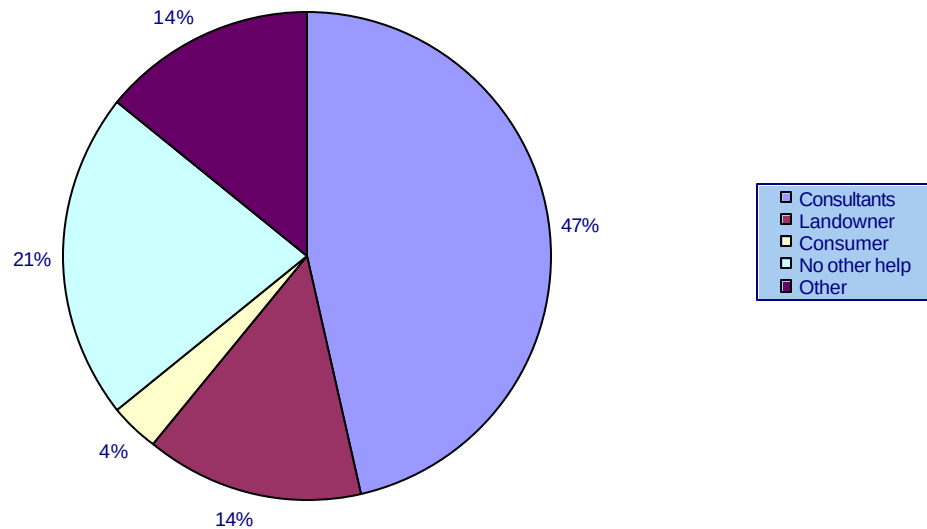
10. How much involvement does the consumer have in planning the following activities?

**Involvement of Consumers in Planning for Loggers**



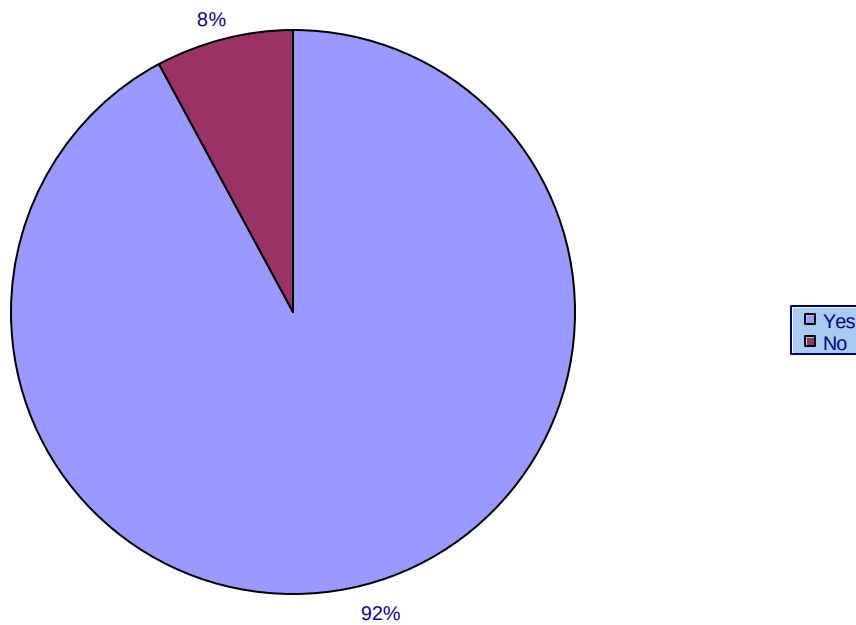
11. What other parties do you receive assistance from when planning?

**Entities Who Provide Planning Assistance to Dealers**



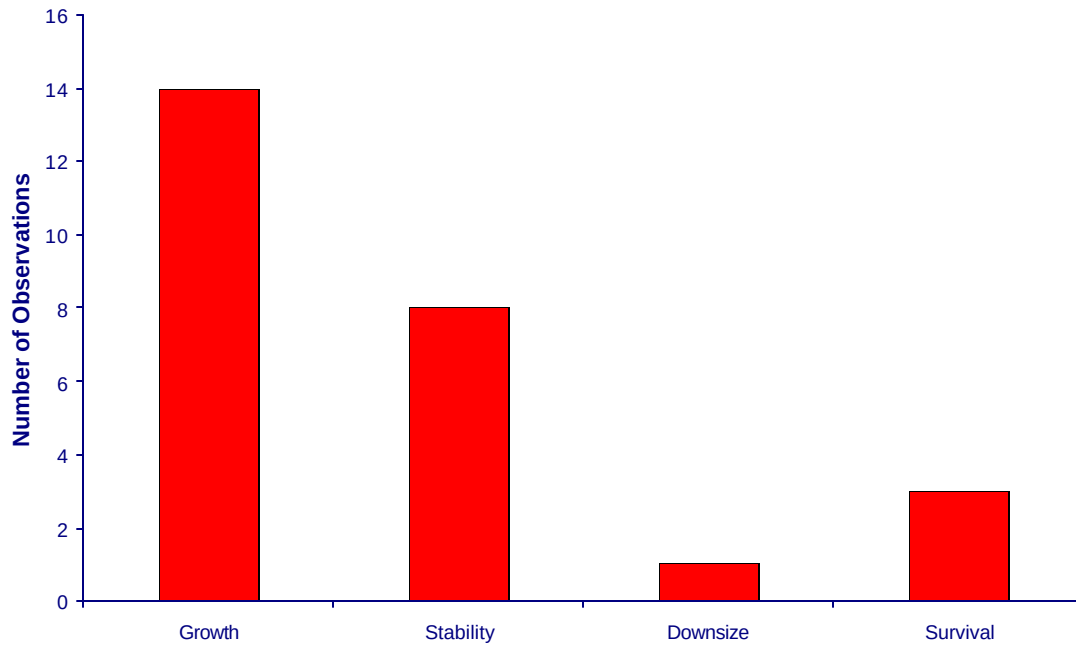
12. Do you have a long term plan for the growth and improvement of your business?

**Breakdown of Dealers That Have a Long Term Goal for Their Operation**



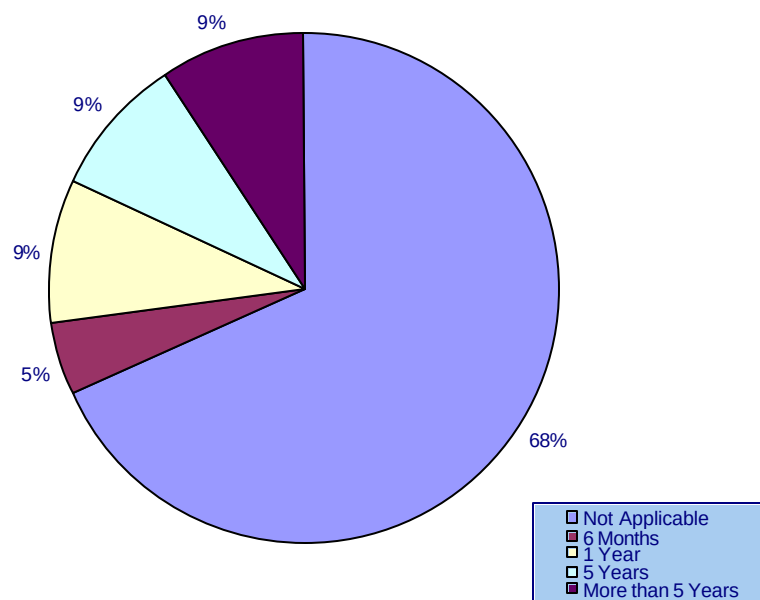
13. If yes, what does it involve, if no why not?

**Focus of Wood Dealers' Long Term Planning**



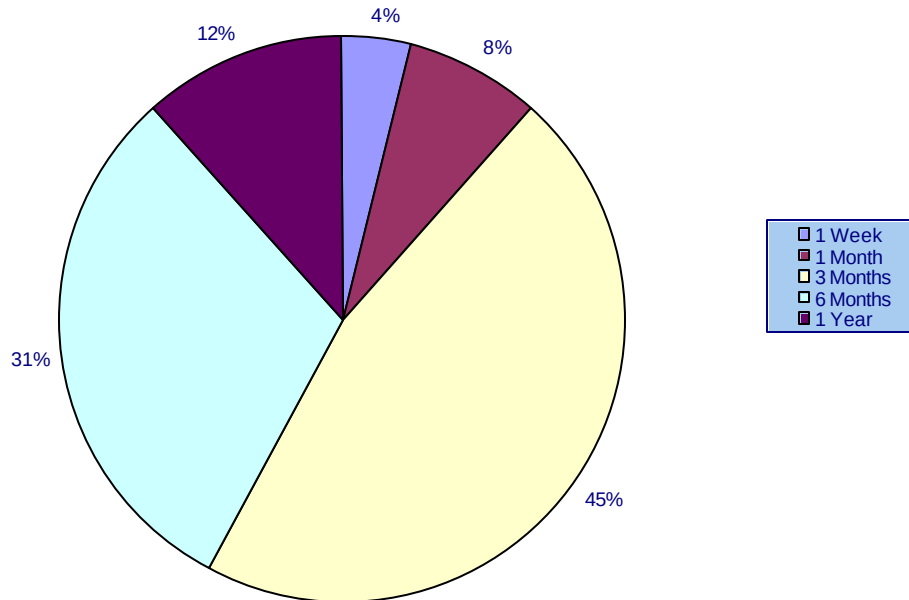
14. What is your planning horizon for equipment purchases?

**Breakdown of Stumpage Equipment Purchase Planning**



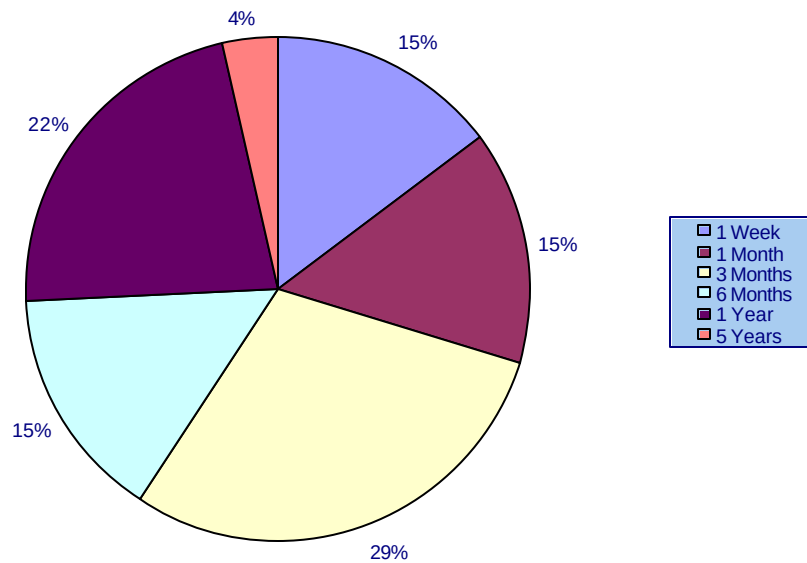
15. What is your planning horizon for acquiring/purchasing stumpage?

**Breakdown of Planning for Stumpage Purchases**



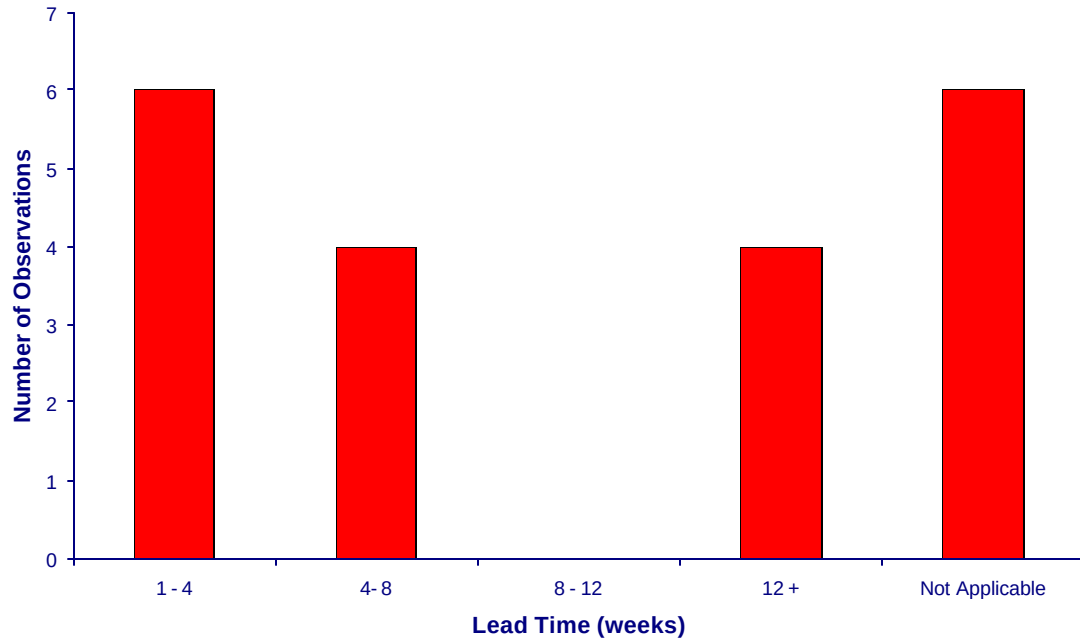
16. What is your planning horizon for marketing your harvested timber (products)?

**Breakdown of Planning for Marketing Products**



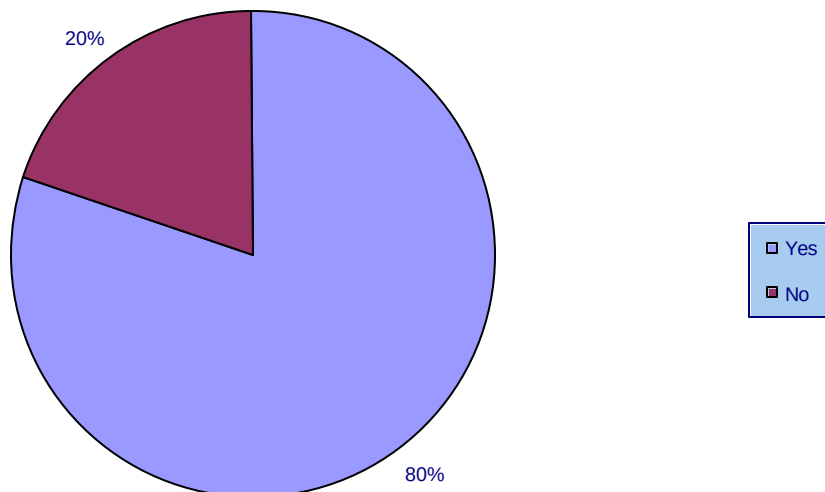
17. How much lead-time do you typically receive prior to starting a harvest?

**Typical Amount of Lead Time Provided Prior to Harvest**



18. Is this enough time? \_\_\_\_ yes \_\_\_\_ no

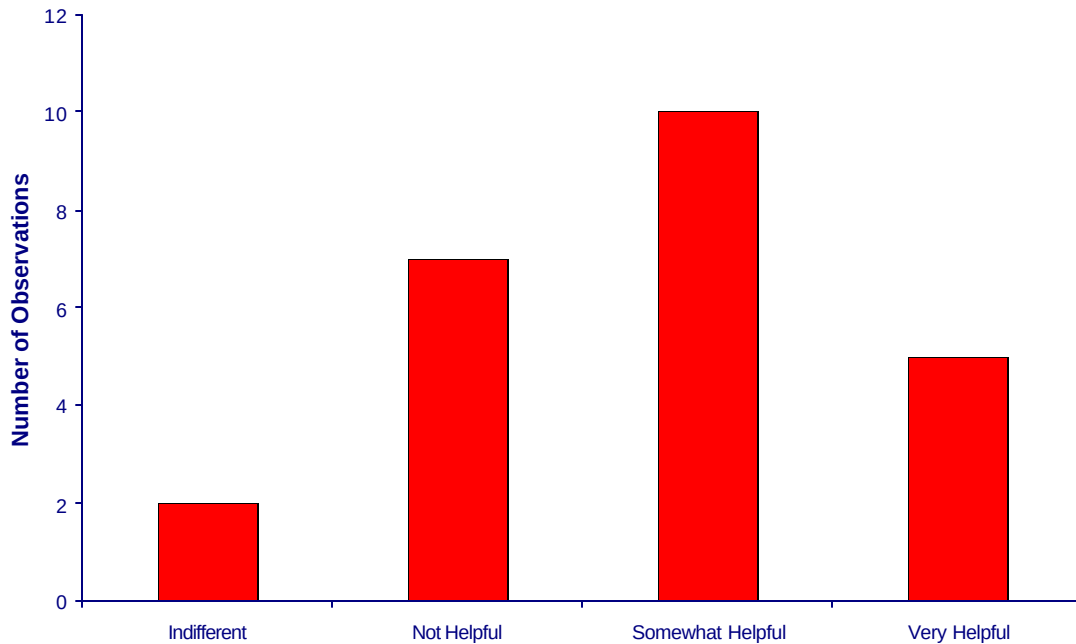
**Is Current Leave Time Adequate**



19. If not how much would be acceptable?

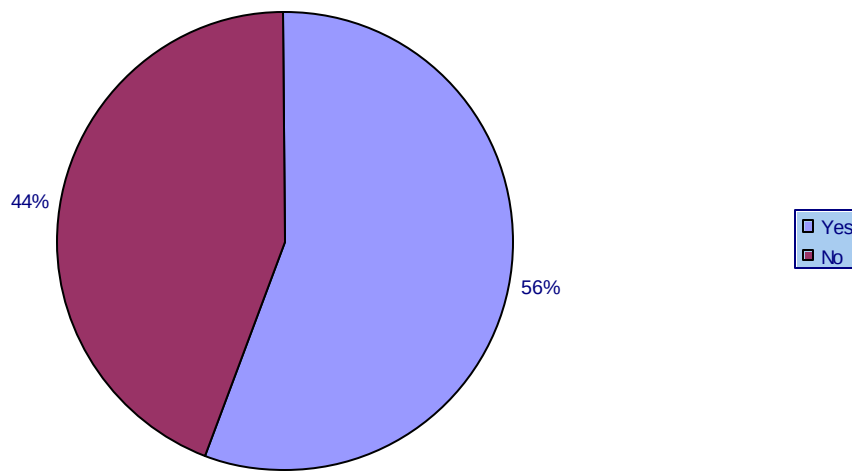
20. How helpful the consumers in setting realistic production goals?

### How Helpful are Consumers in Setting Realistic Goals



21. Do you think that consumers understand the affects that lost production has on your operation?

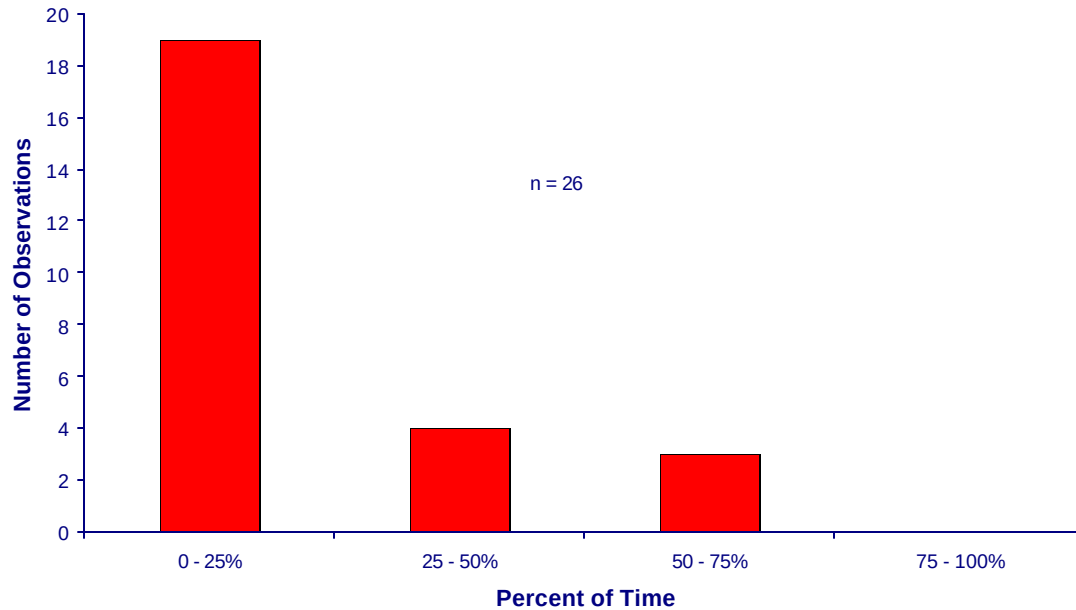
### Do Consumers Understand The Affects of Lost Production on Your Operation



22. How do actions of consumers impact your ability to plan your operation? **Get quotes from Spreadsheet**

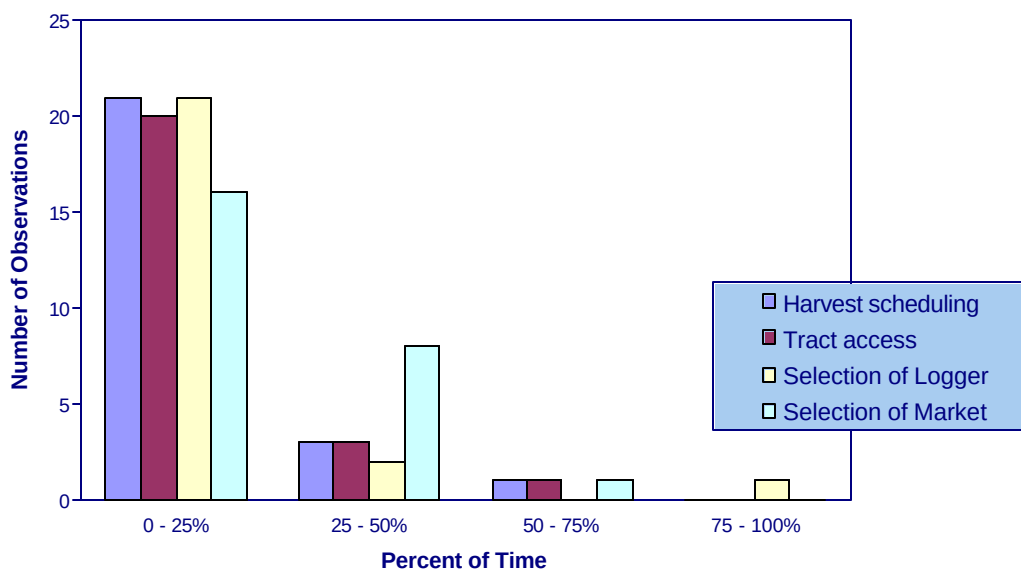
23. How much of your total time do you spend planning your harvesting operations? \_\_\_\_%

**Breakdown of Amount of Time Spent Planning by Wood Dealers**

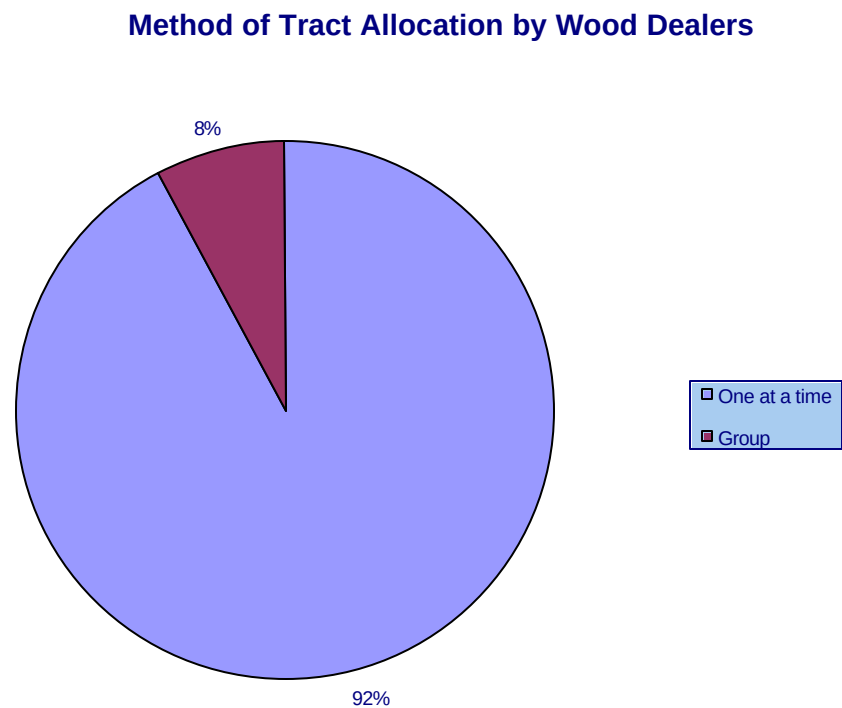


24. What do you spend your time planning time on?

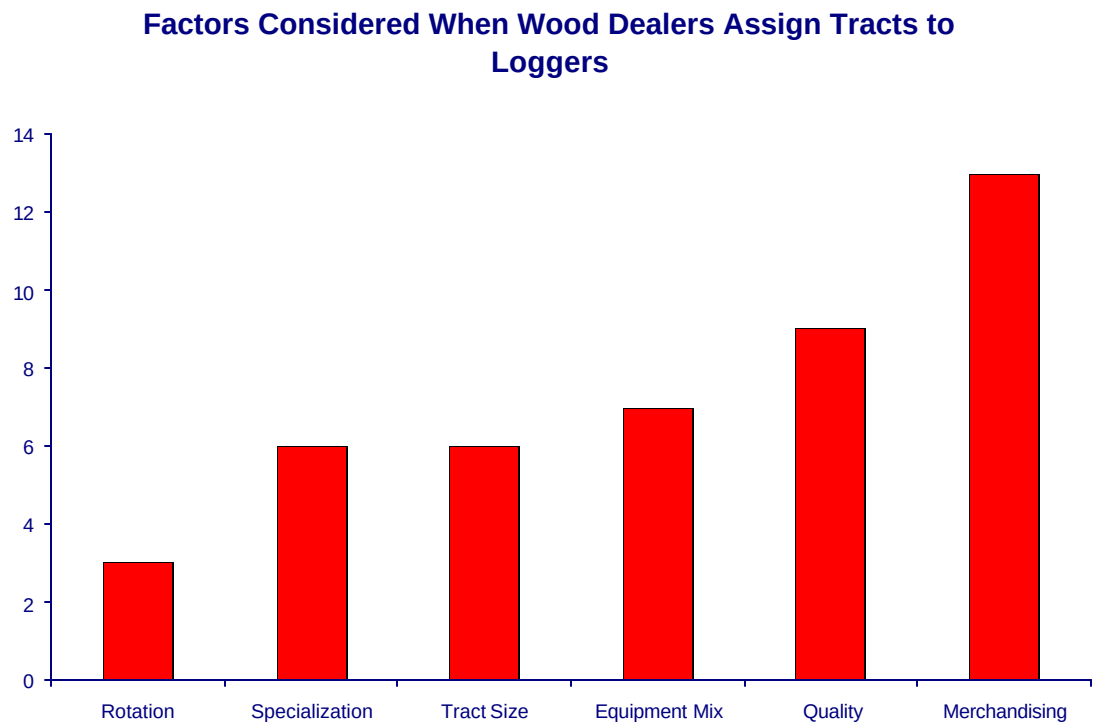
**Areas Where Harvest Planning Time is Spent by Wood Dealers**



25. How do you allocate tracts to your loggers?

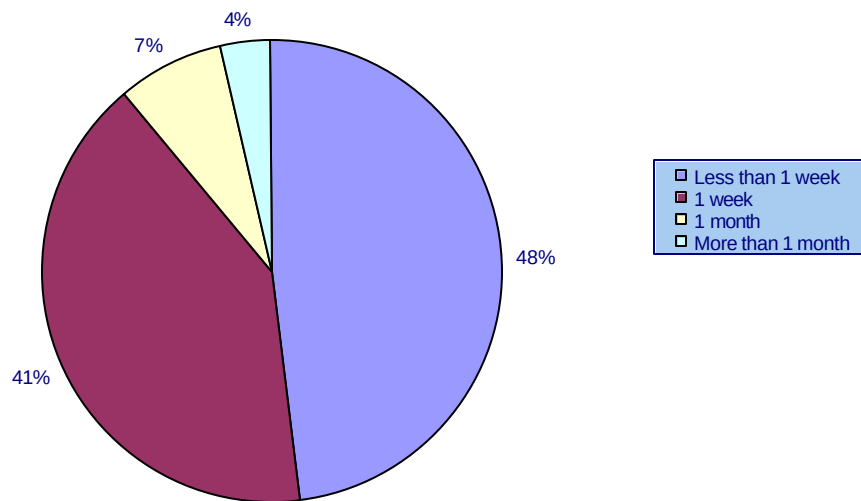


26. What factors do you consider when assigning tracts to loggers?



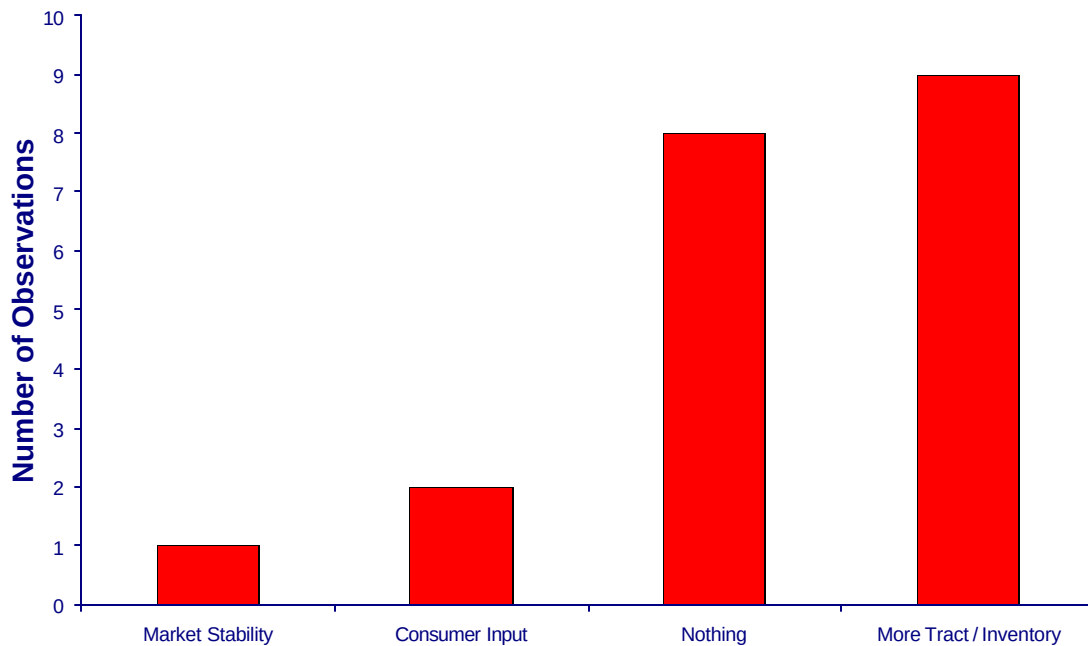
27. How much lead time do you typically give your loggers prior to starting a tract?

**Amount of Lead Time Given for Tracts Provided by Wood Dealer**



28. What could be done to improve your current system of tract allocation?

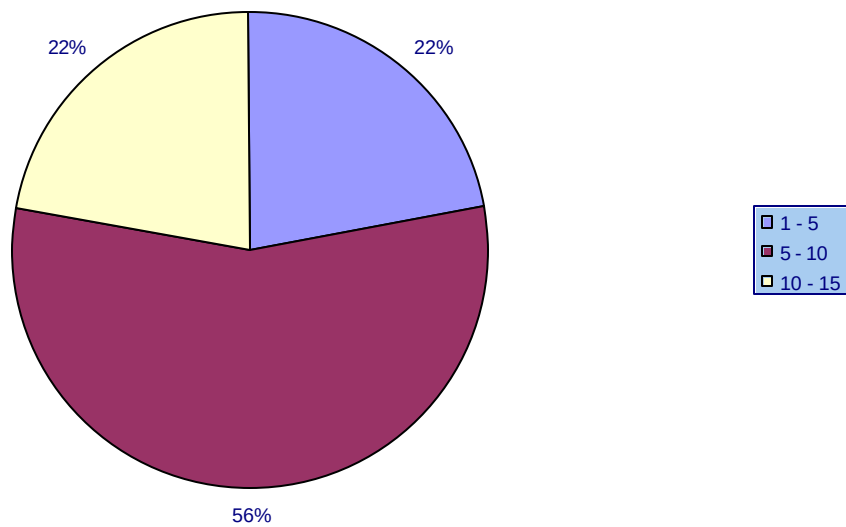
**What Could Be Done to Improve Current Allocation System**



## PURCHASING

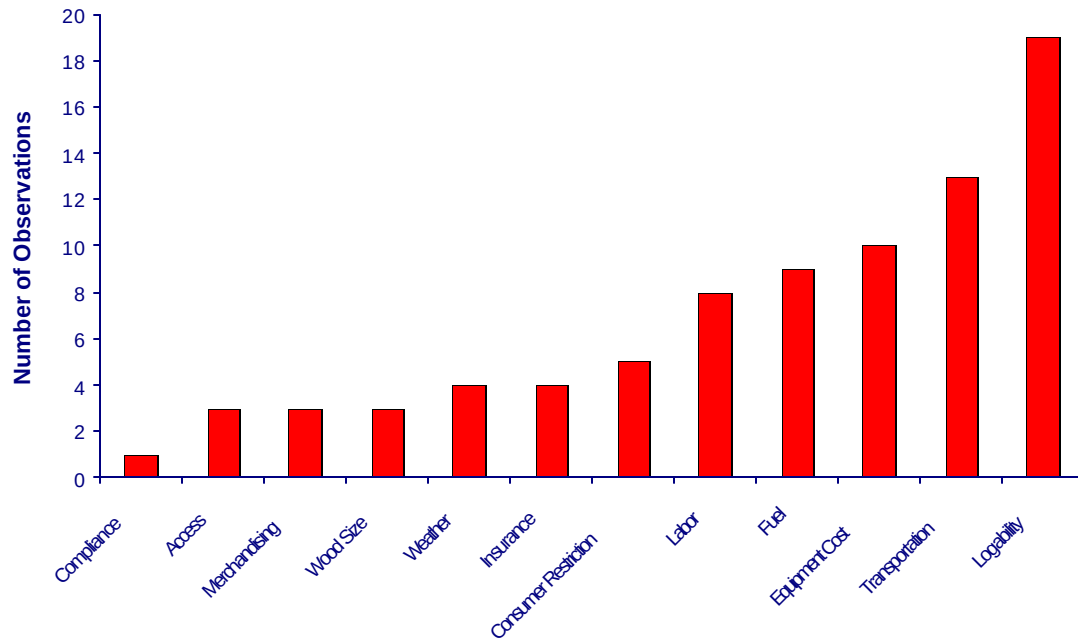
29. How many product sorts do you deal with?

**Number of Sorts Made by Wood Dealers**



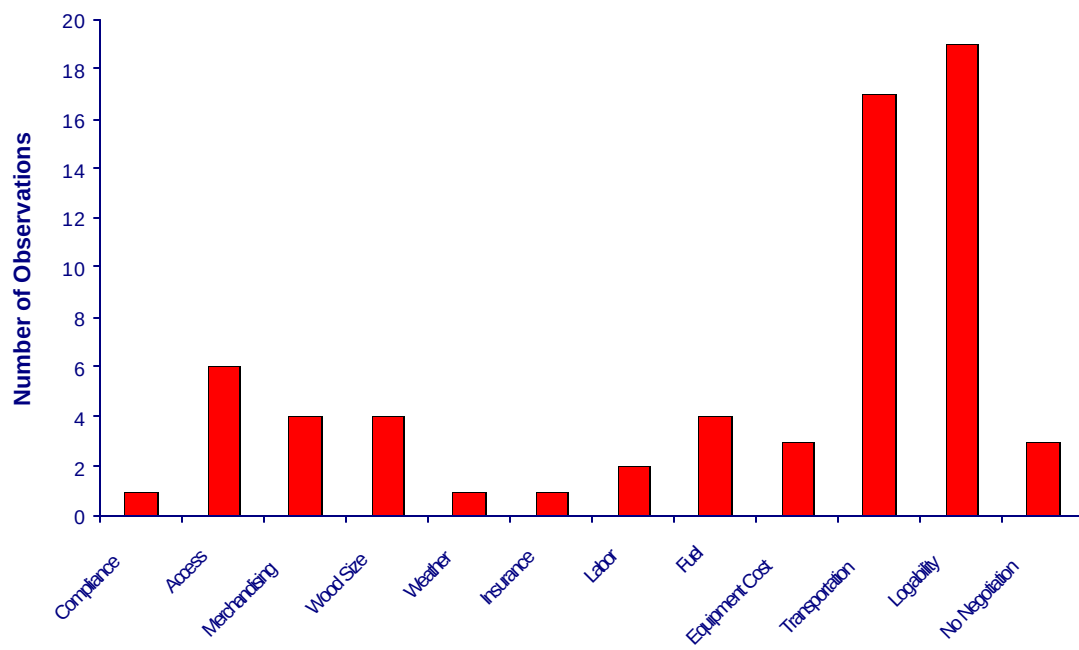
30. What are the major factors that affect your actual logging cost?

### Major Factors That Affect Logging Cost



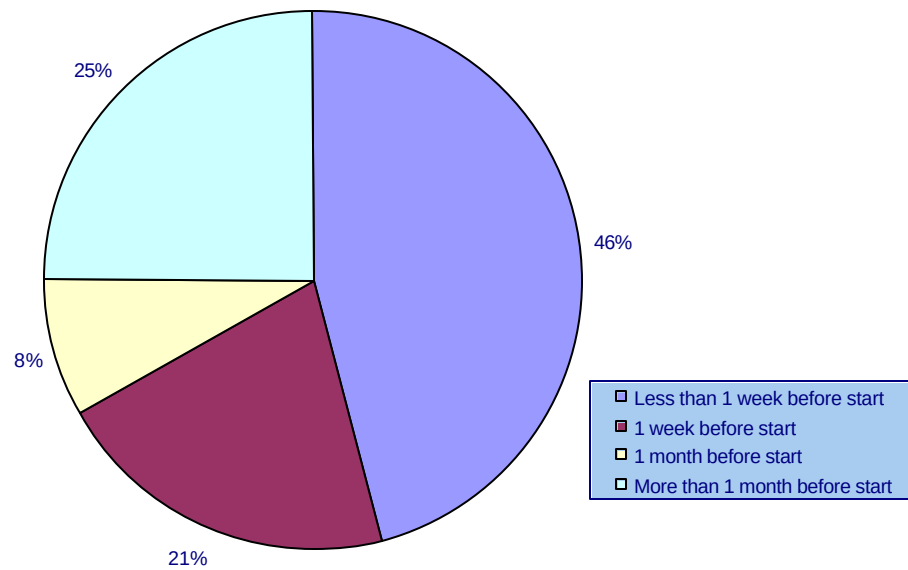
31. Which of these factors are included in the negotiations to determine the cut and haul rate for a given tract?

### Factors Included in Compensation Negotiations



32. When do you determine the cut and haul rate for a given tract?

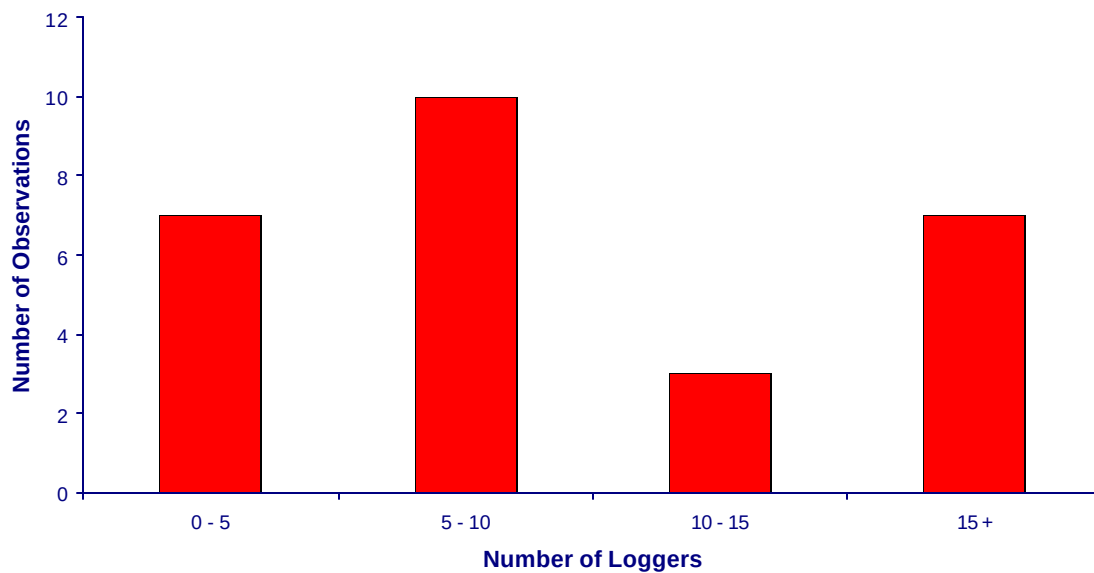
### Breakdown of When Compensation is Agreed Upon Between Logger and Dealer



### SUPPLIERS

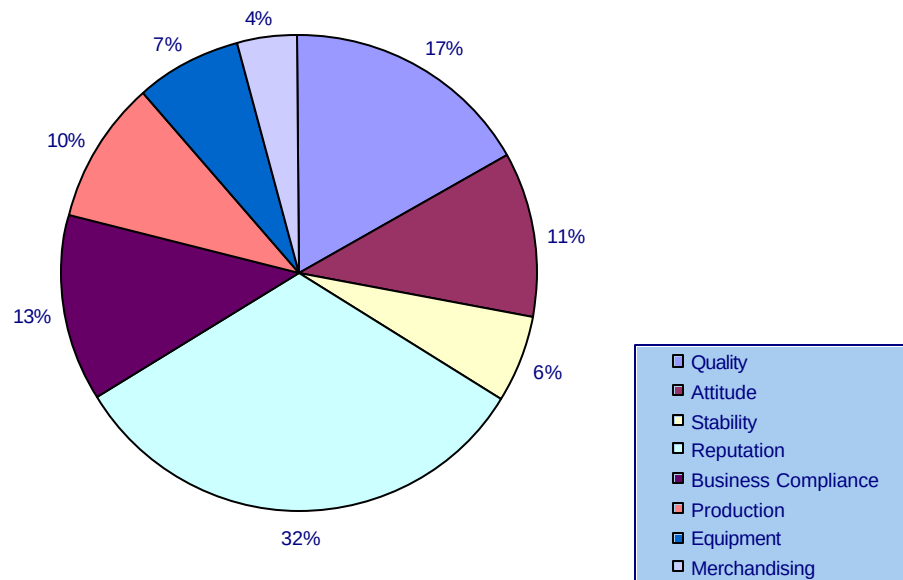
33. How many loggers do you work with?

#### Number of Loggers That Wood Dealers Work With



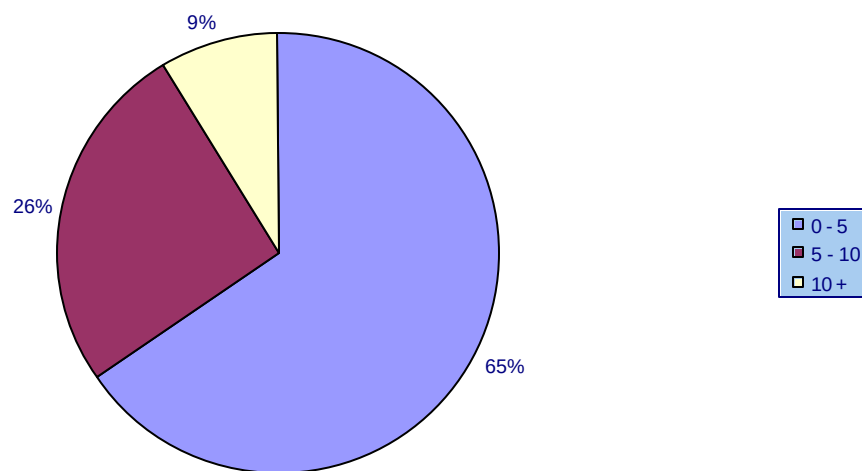
34. What are the main criteria that you use to select loggers?

### Qualities Sought in A Preferred Supplier



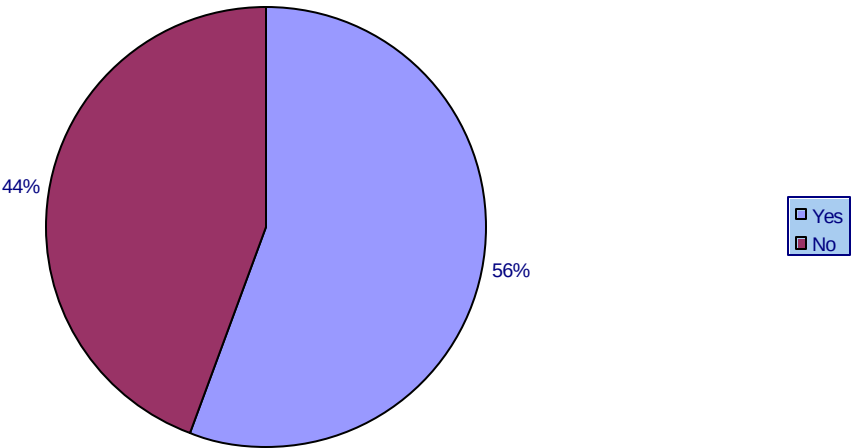
35. How many of the loggers that you work with are considered preferred / core suppliers for a consumer?

### Number of Loggers Working for a Dealer That Are Considered Core Suppliers



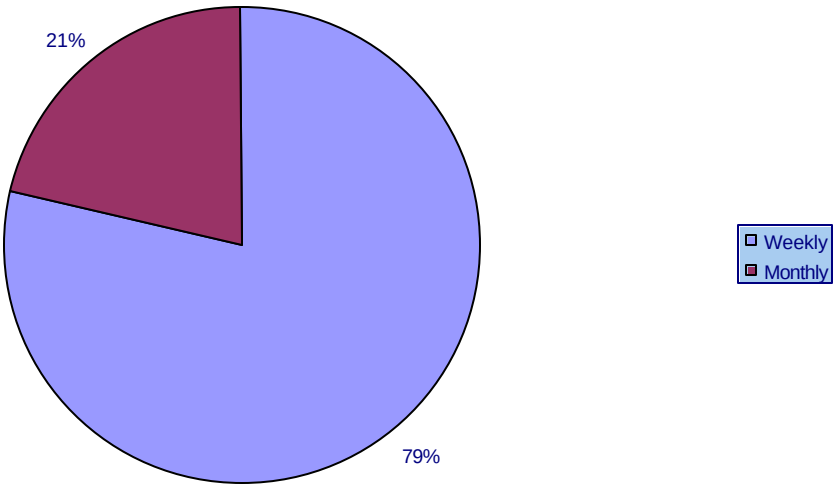
36. Do you set production targets for your loggers?

**Breakdown of Dealers Who Set Production Targets for Their Suppliers**



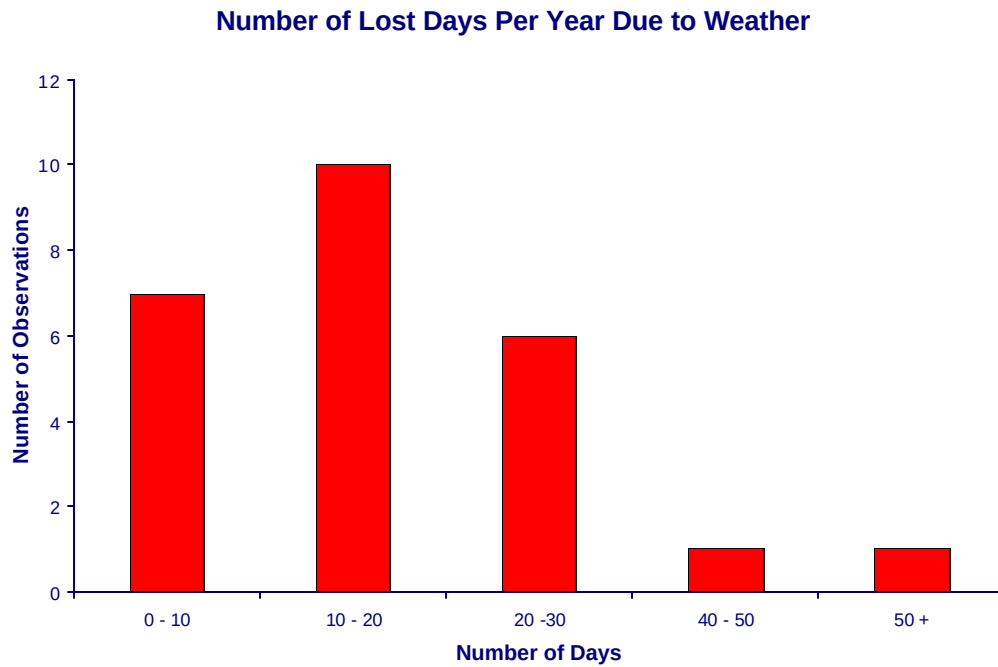
37. If yes, what is the time frame for these targets?

**Time Frame for Production Targets Set by Wood Dealers**

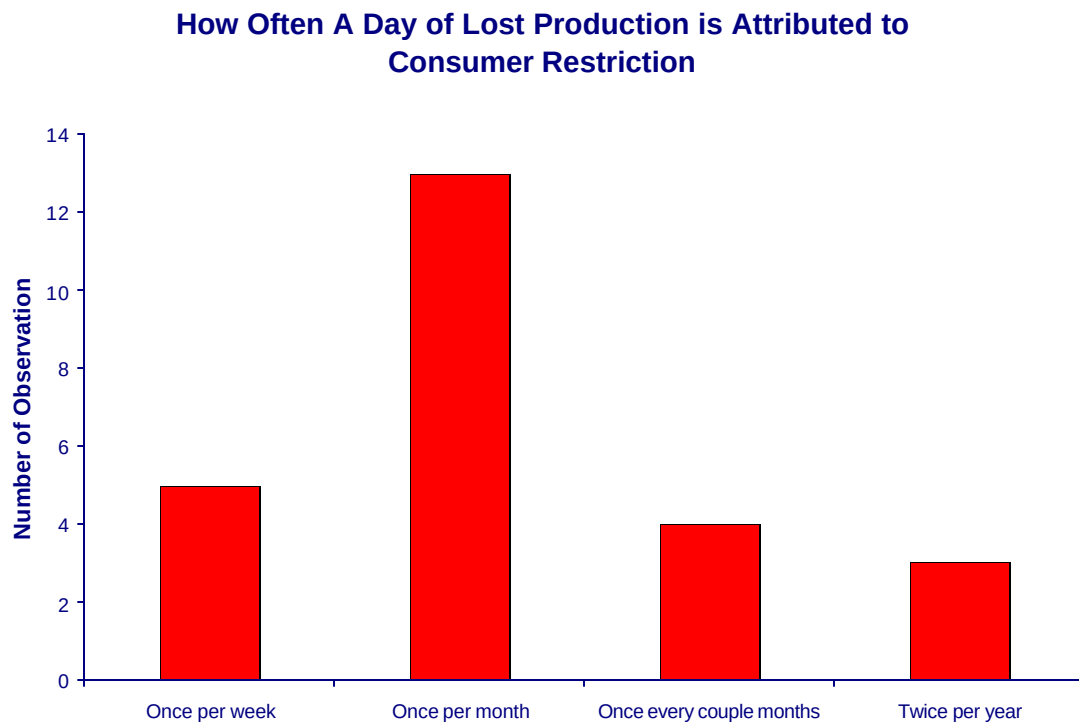


## LOGGING

38. How many days of production do you lose a year due to weather related problems?

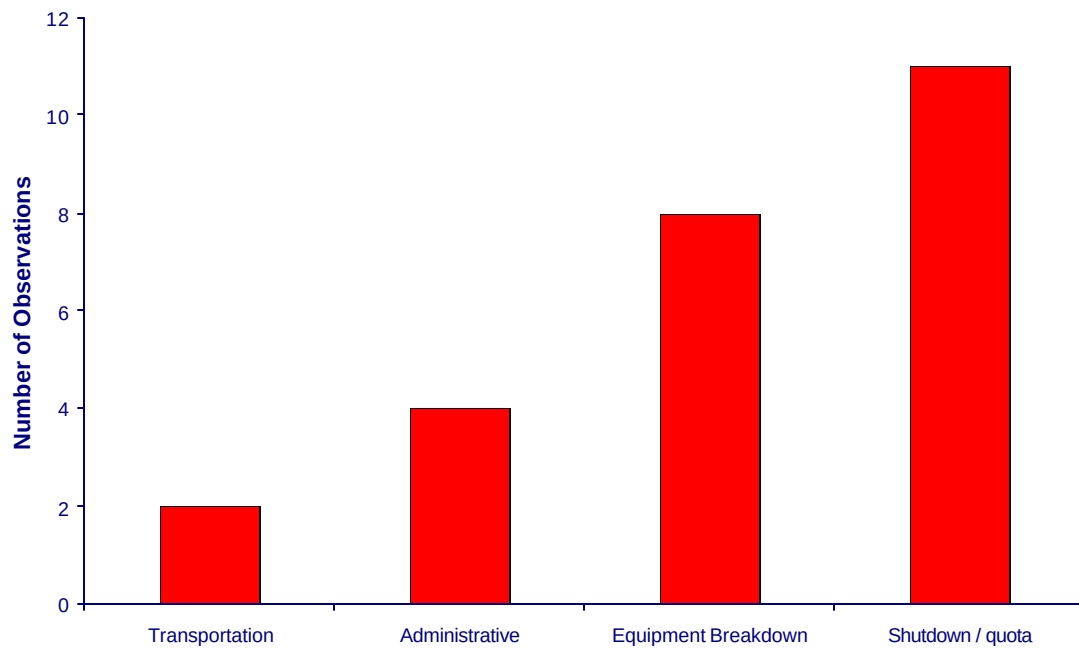


39. How often do you loose a day of production because of the consumer restriction?



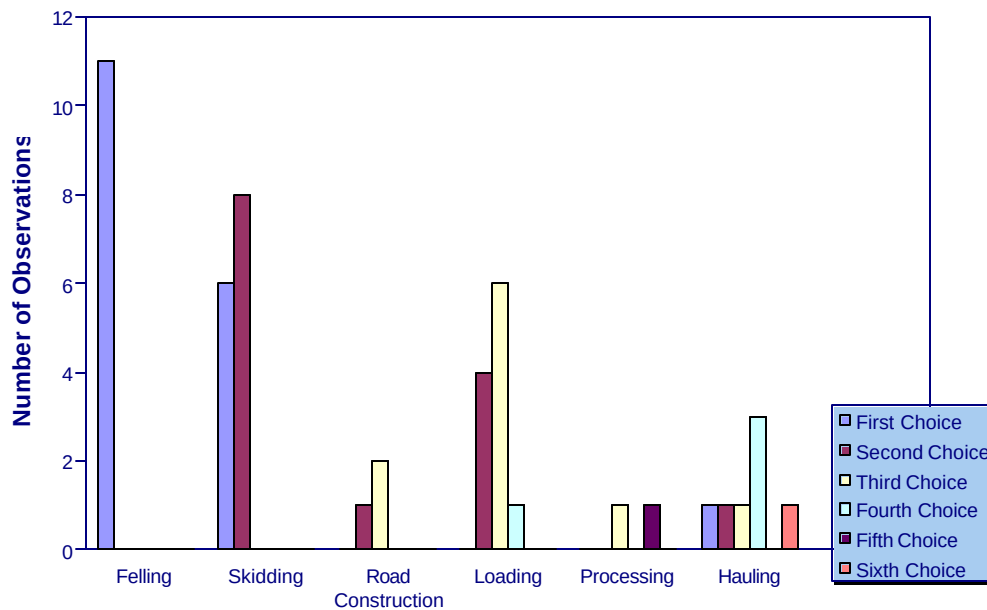
40. Aside from weather, what is the most common operational factor that limits your system?

#### Most Common Operational Limiting Factor Next to Weather



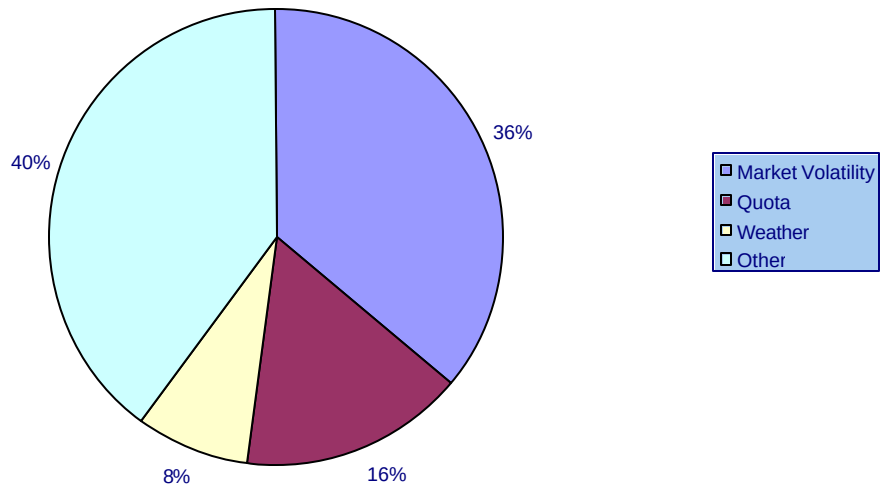
41. Do the loggers that you work with have additional production capacity?

#### Areas That Logging Contractors Carry Additional Capacity



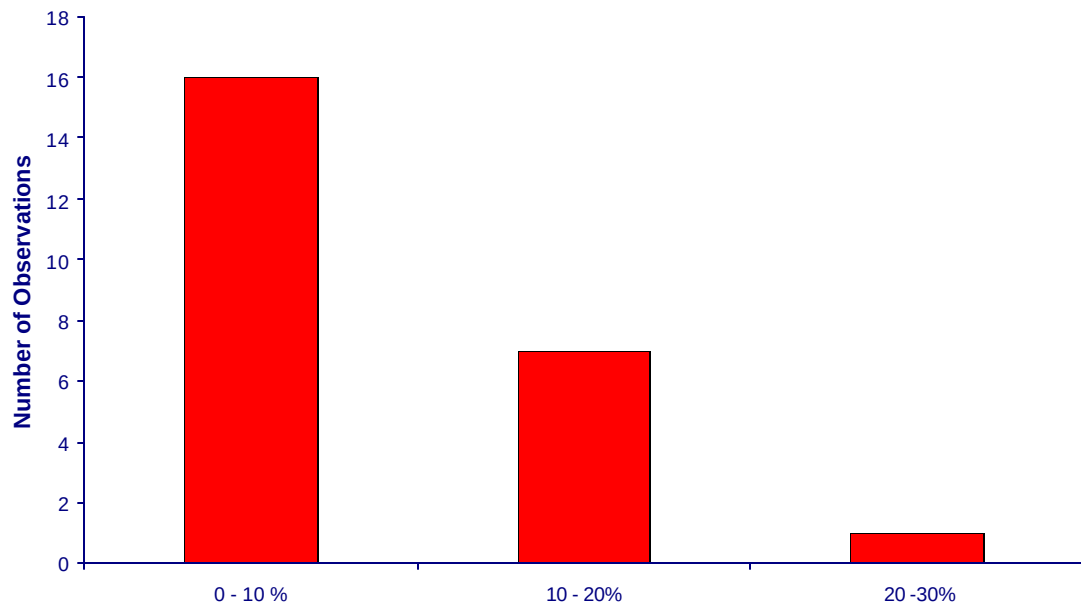
42. Why do logging contractors carry additional capacity?

**Breakdown of Reason for Carrying Additional Capacity**

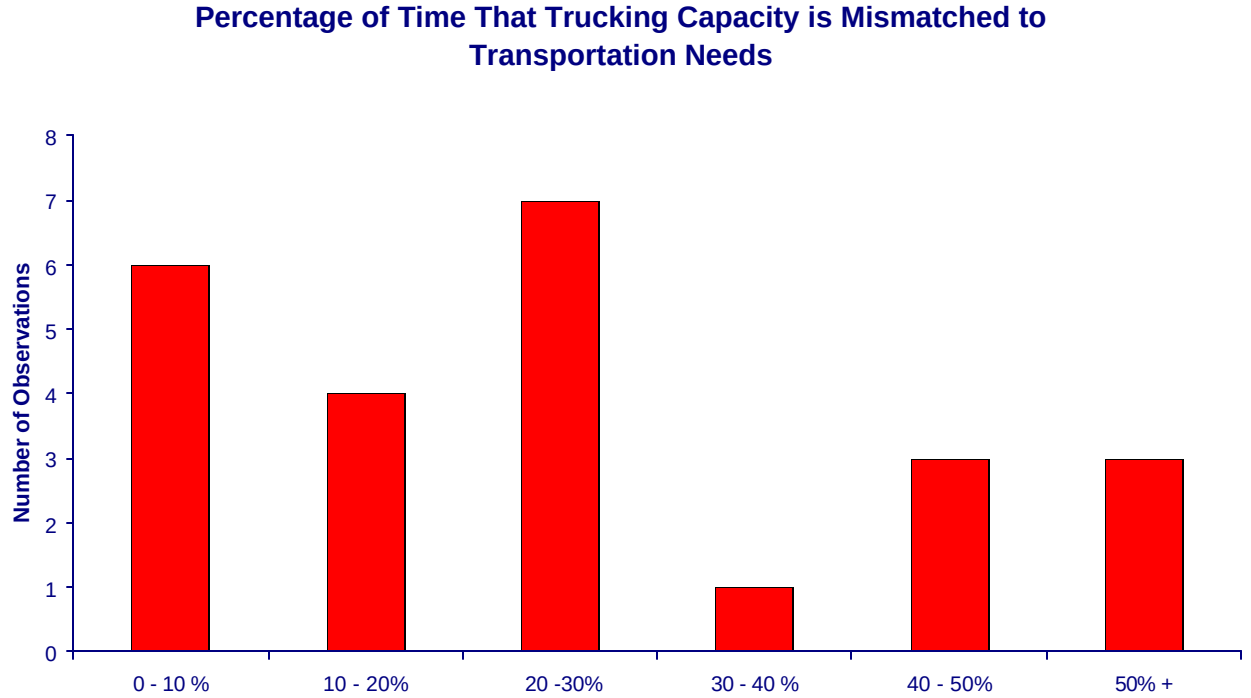


43. What percentage of the time is your equipment not well suited to the tract that you are harvesting?

**Percentage of Time That Timber and Harvesting System are Mismatched**



44. What percentage of the time do you have too much or not enough trucking capacity, and what are the main reasons for this?



45. What do you personally think could be done in terms of planning and communication to make your job easier?

## Consumer Questionnaire

1. What type of mill(s) do you procure for (**Give percentage for each**)?

\_\_\_\_\_ hardwood lumber

\_\_\_\_\_ pine lumber

\_\_\_\_\_ chip-n-saw

\_\_\_\_\_ paper mill

\_\_\_\_\_ chip mill

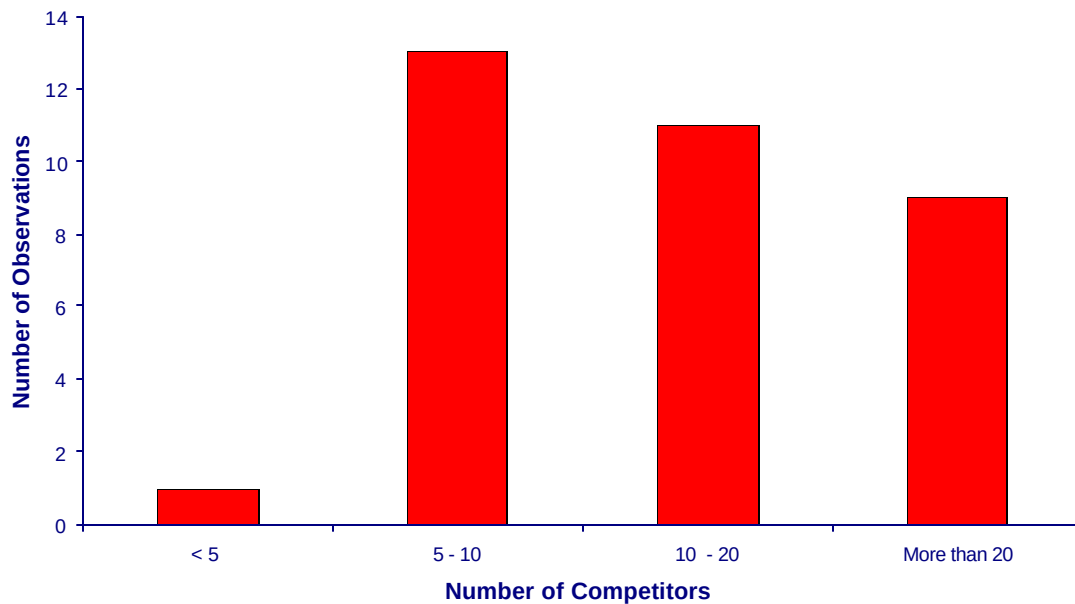
\_\_\_\_\_ oriented strand board

\_\_\_\_\_ other (describe) \_\_\_\_\_

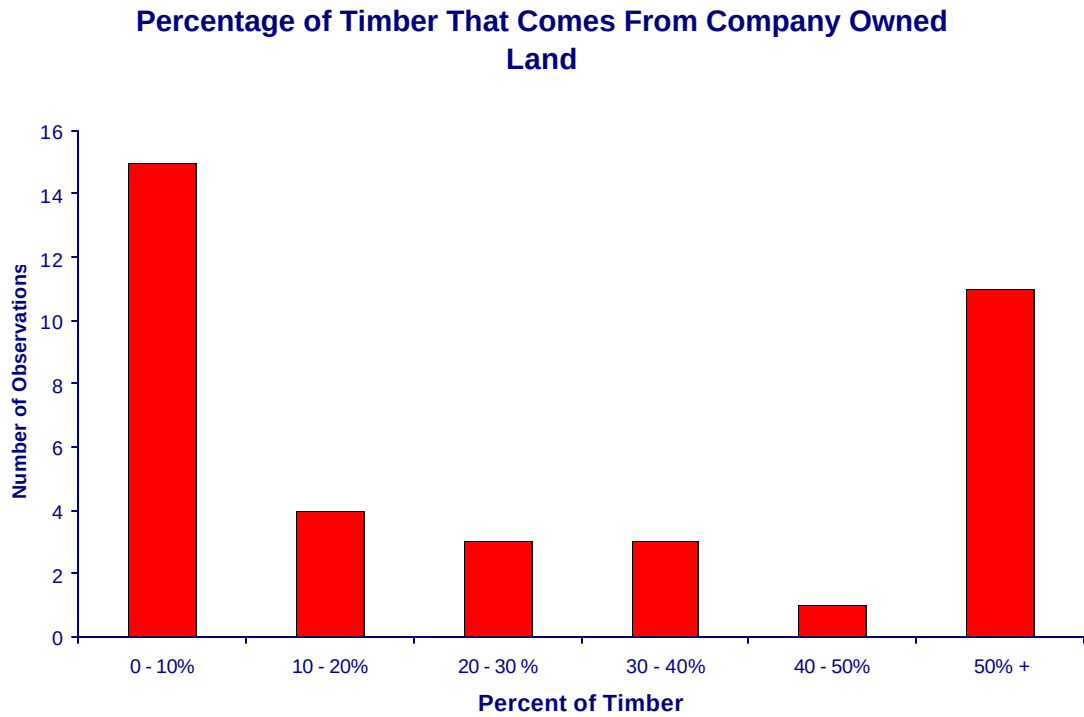
2. What are your main job responsibilities?

3. How many direct competitors do you have for timber in your region

### Number of Direct Competitors for Timber in the Area

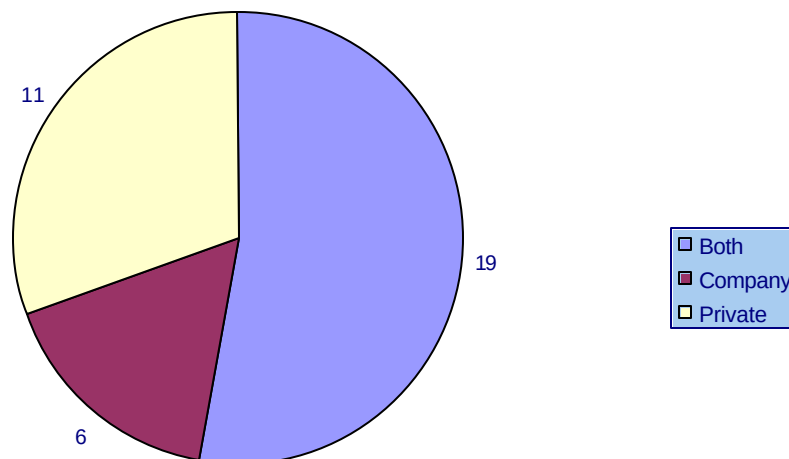


4. What percentage of raw material comes from company owned land?

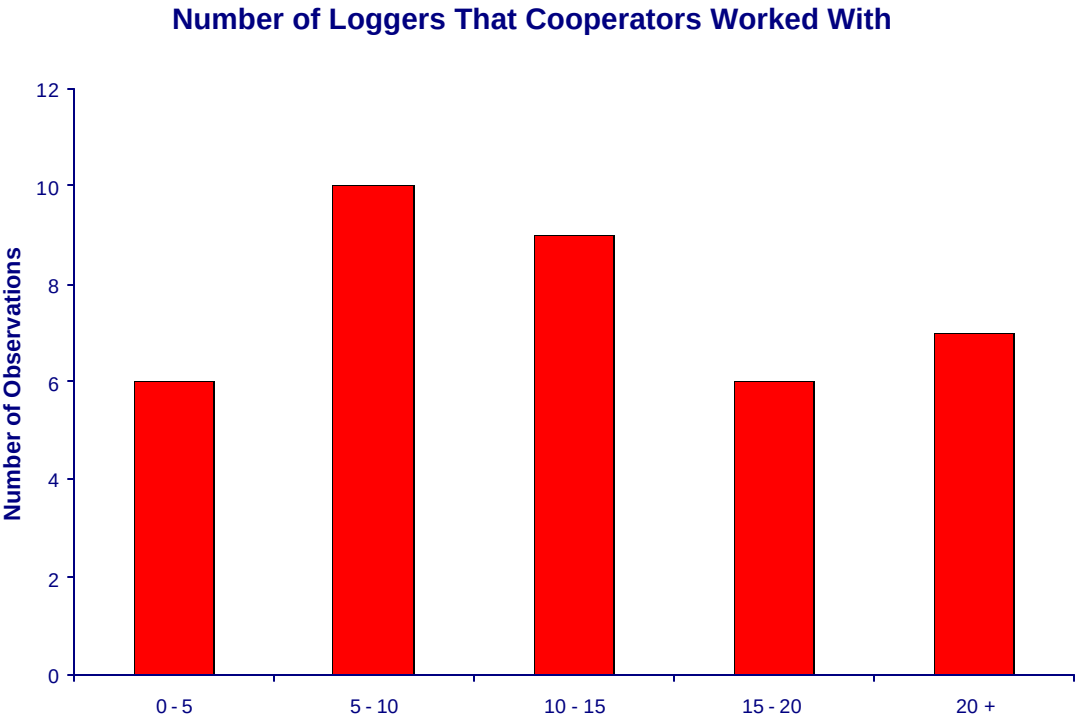


5. Are you responsible for procurement on?

**Breakdown of Timber Procurement by Consumer**

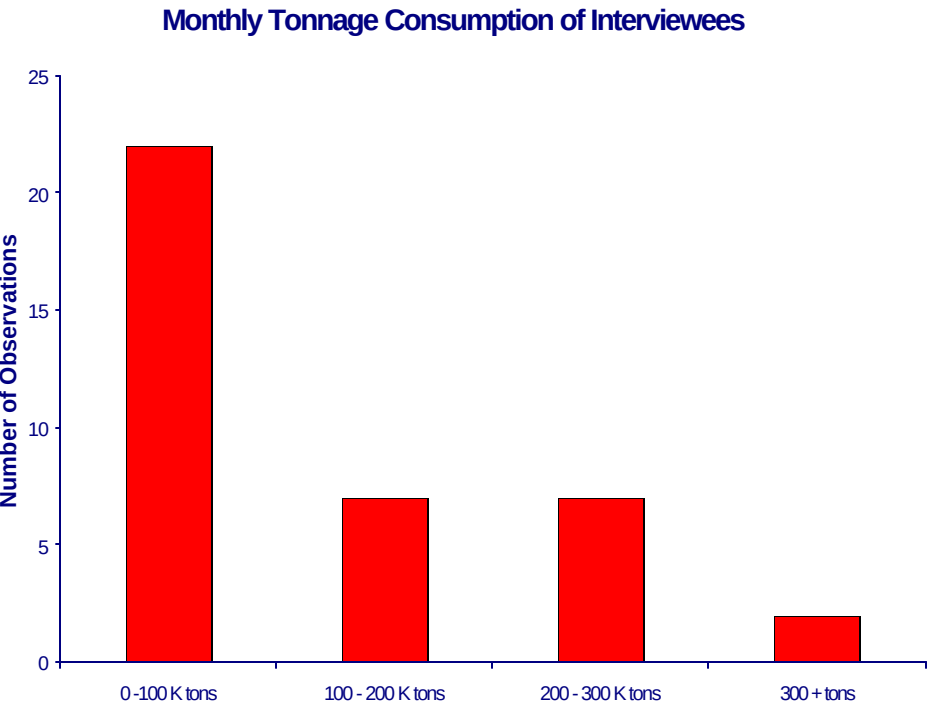


6. How many suppliers (loggers/dealers) do you personally work with?



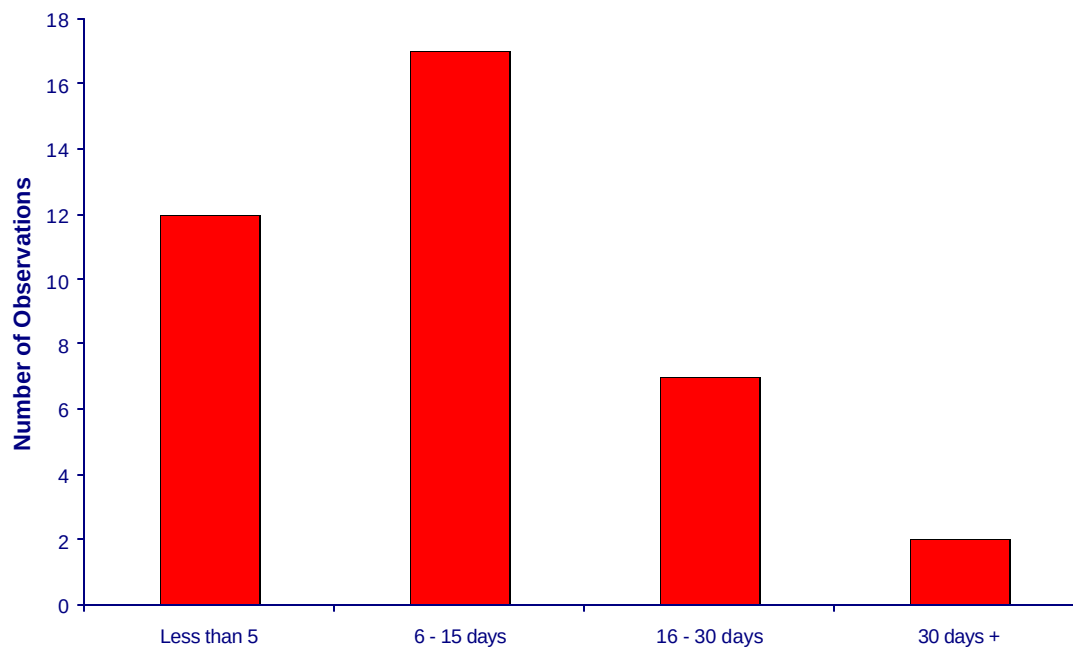
**INVENTORY**

7. How much raw material does the mill that you work for require per month?



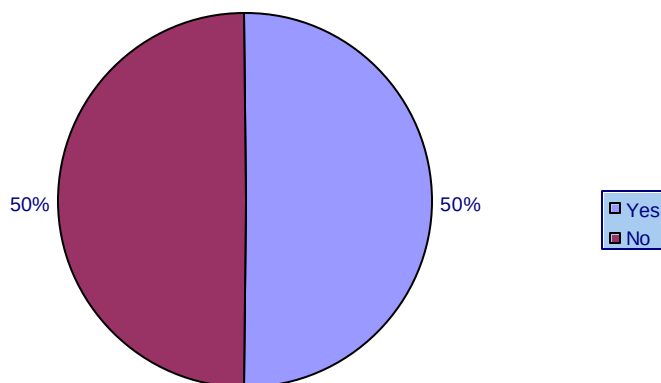
8. How many days inventory of raw material does your main mill keep in the main wood yard?

**Number of Days Worth of Inventory Maintained**

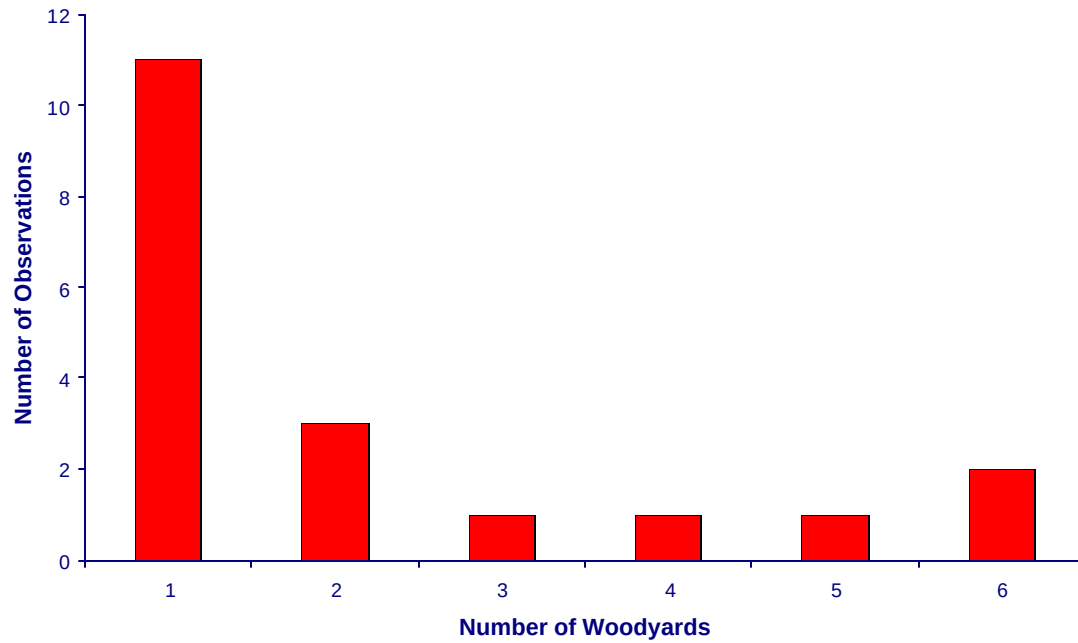


9. Does the mill have satellite yards where wood is stored?

**Breakdown of Consumers With Satellite Woodyards**

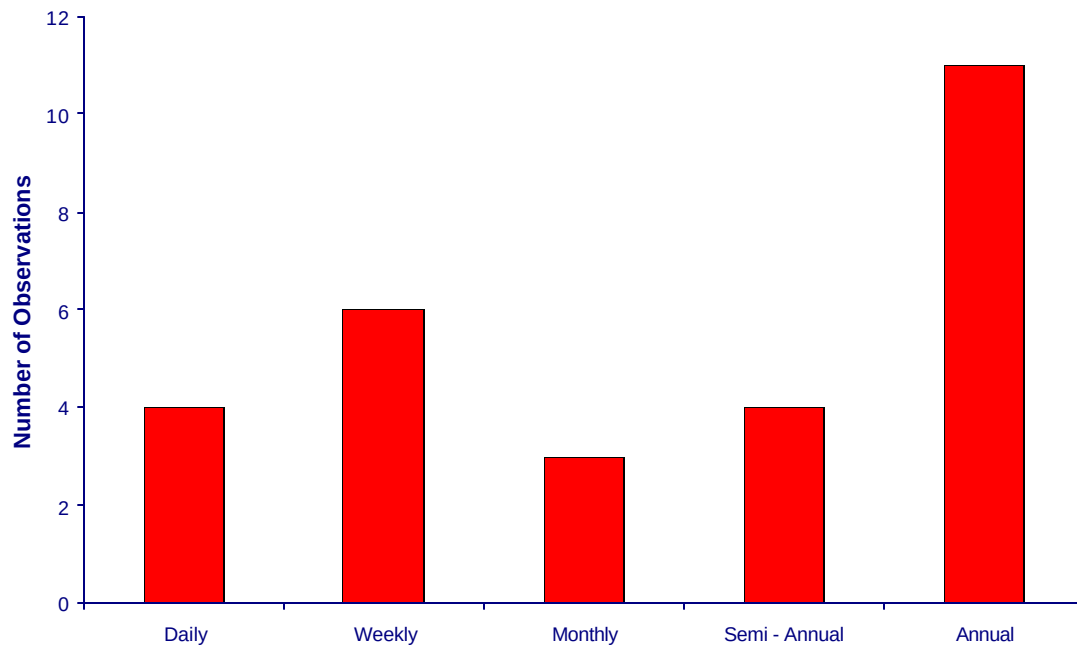


### Distribution of Woodyards

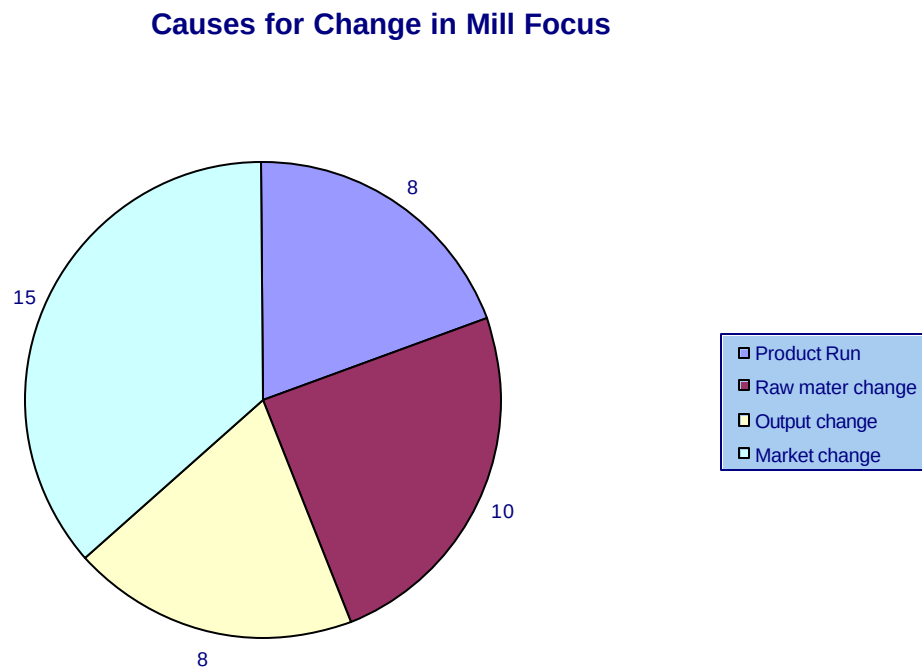


10. How often does the consumption mix of the mill change?

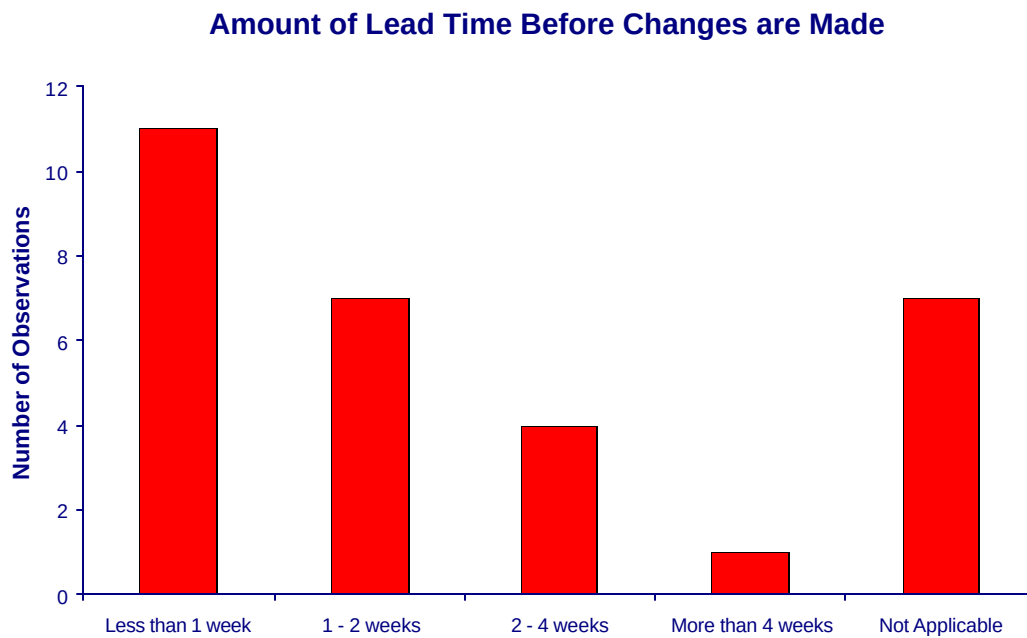
### How Often Consumption Mix of the Mill Changes



11. What causes the mill to change its consumption mix?



12. How much lead time do you get before the mill changes its raw material requirement needs?



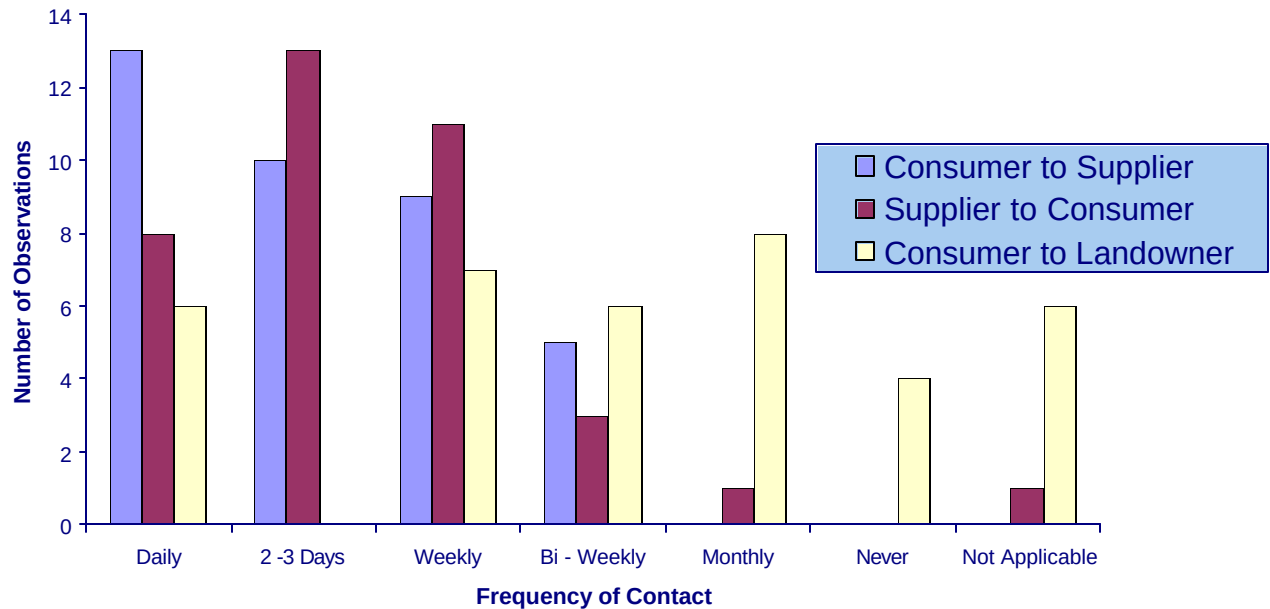
## COMMUNICATION

13. On average, how often do you contact a supplier who you work with?

14. On average, how often do suppliers who you work with contact you?

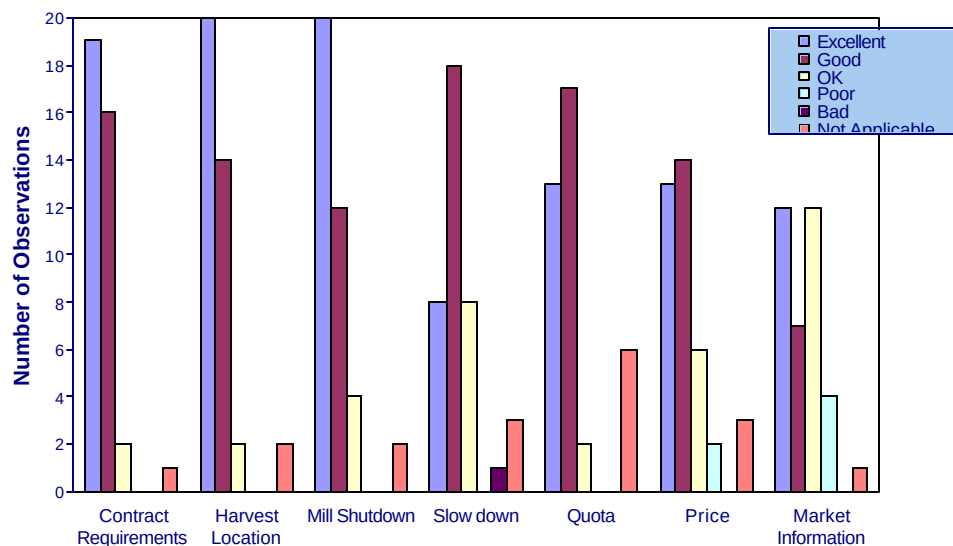
15. How often do you communicate with private landowners?

**Comparison of Contact Between Consumers and Other Parties**

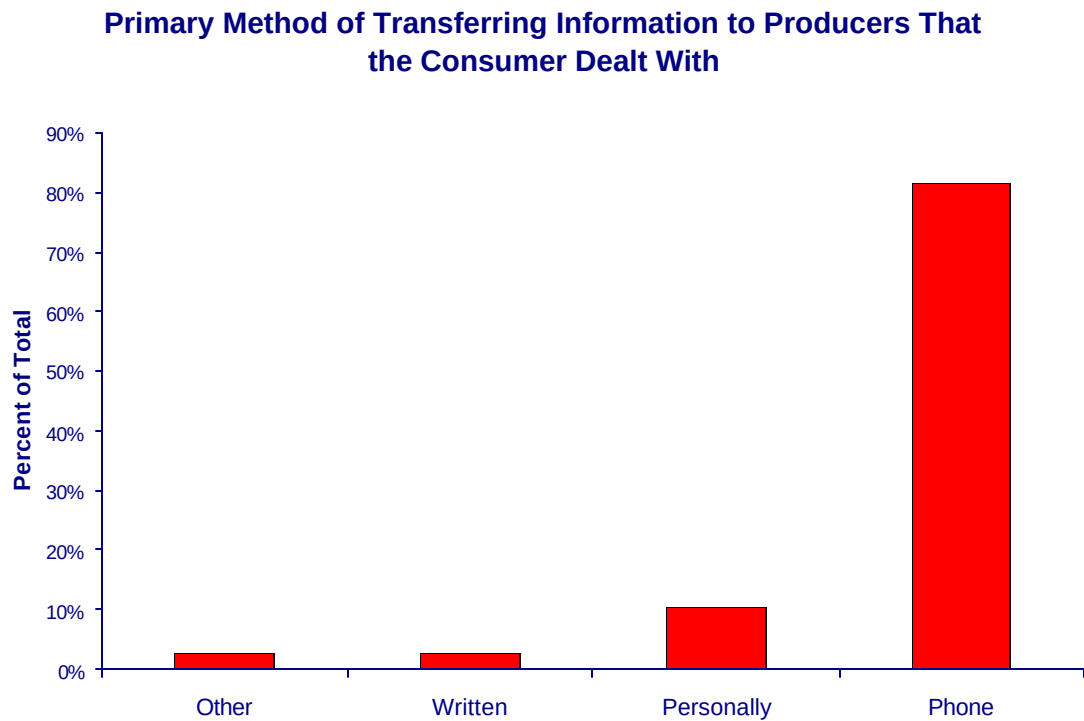
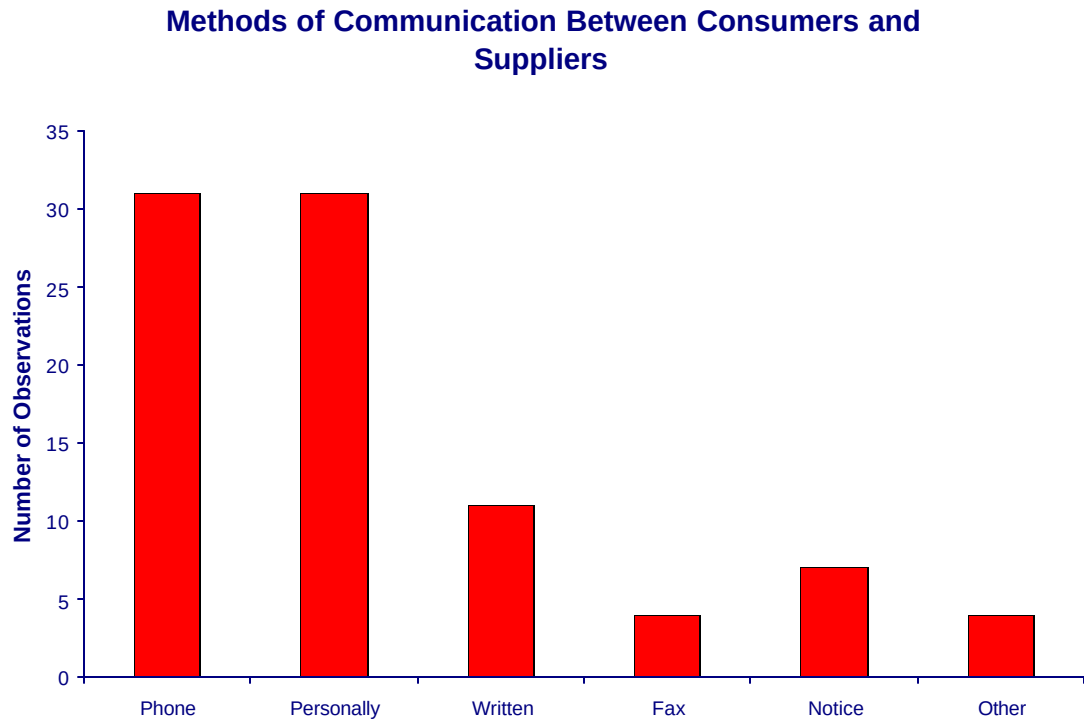


16. How good do think the information is that is exchanged between yourself and the loggers that work with you?

**Quality of Information Exchange Between Loggers and Consumers**



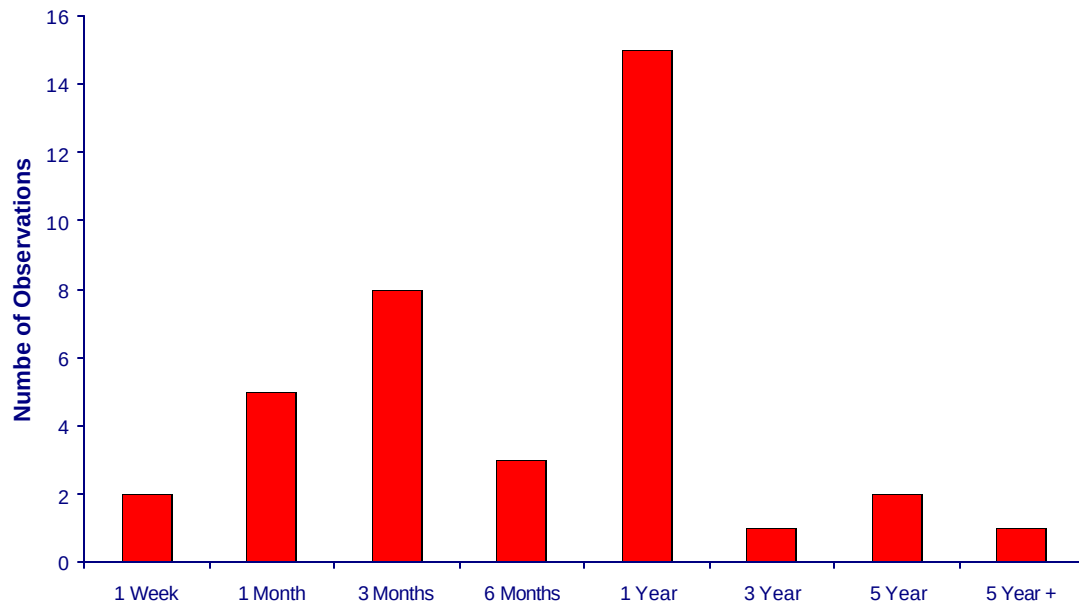
17. How do you transfer information to loggers who you work with?



## PLANNING

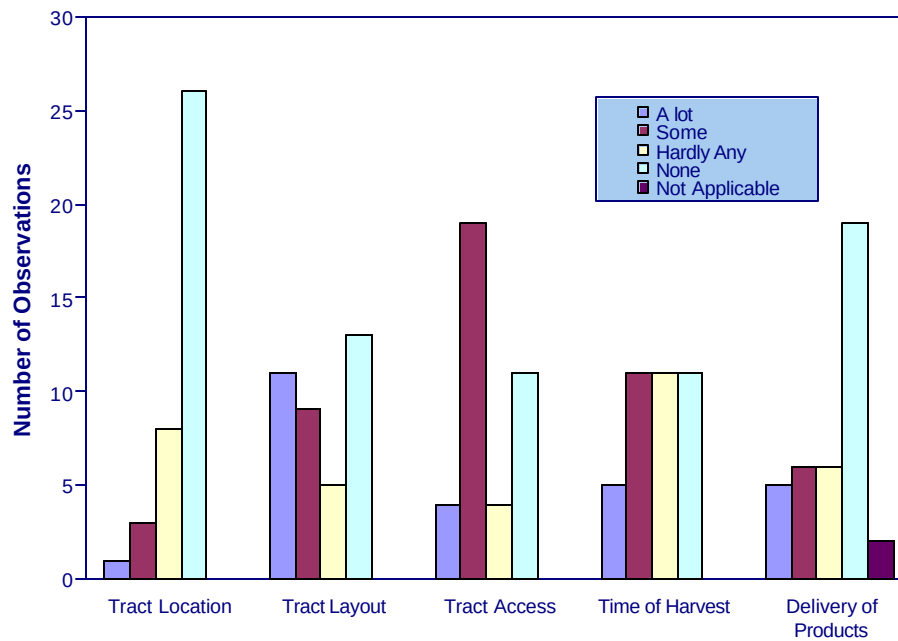
18. What is the planning horizon for wood purchases in your organization?

**Planning Horizon for Wood Purchases for Consuming Organizations**



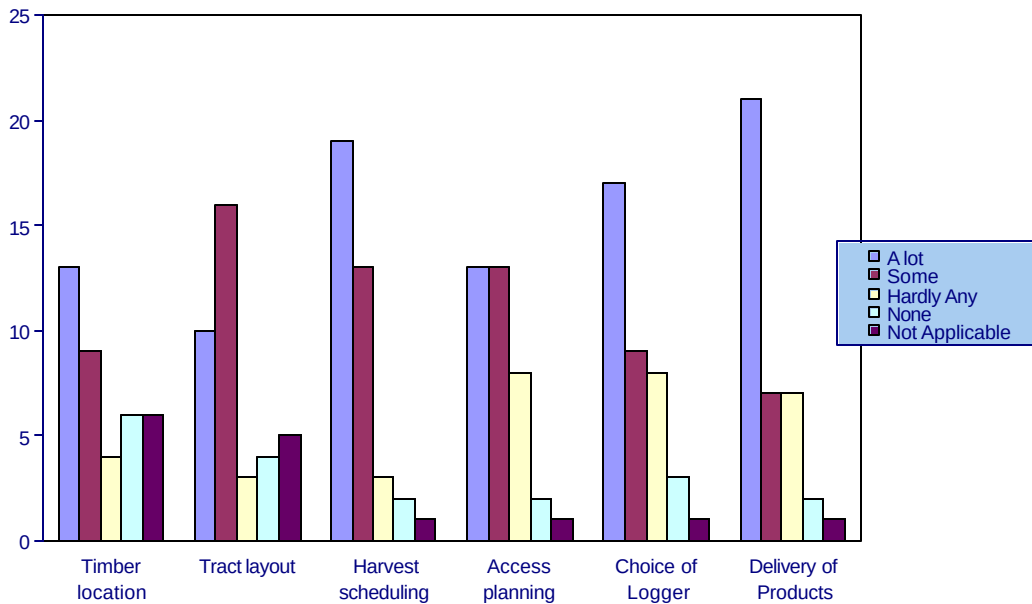
19. How involved is the logger in determining the?

**Logger Involvement in Planning Activities**



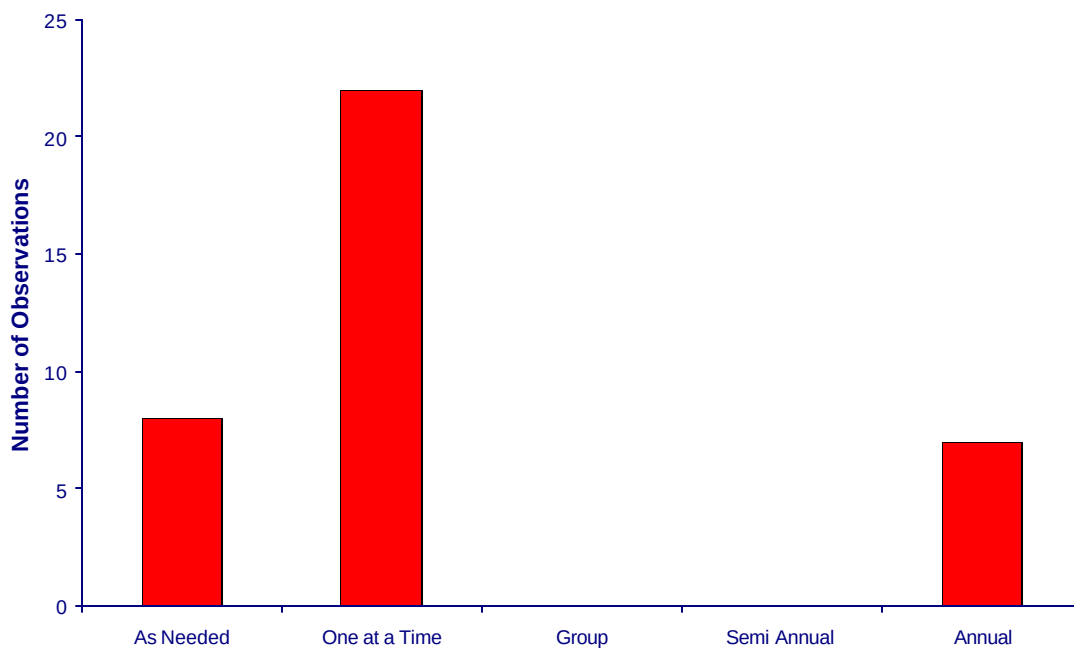
20. How much time do you spend on the following?

**Breakdown of Responses Relating to Time Employee Spends Planning**



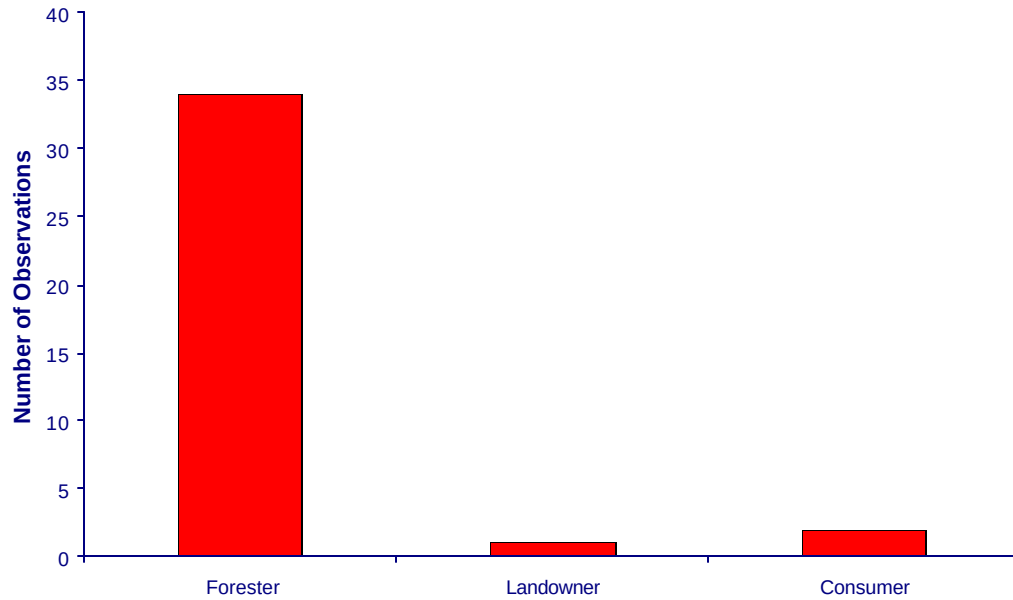
21. How do you allocate tracts to your loggers/dealers?

**Breakdown of Tract Allocation Procedures for Consumers**



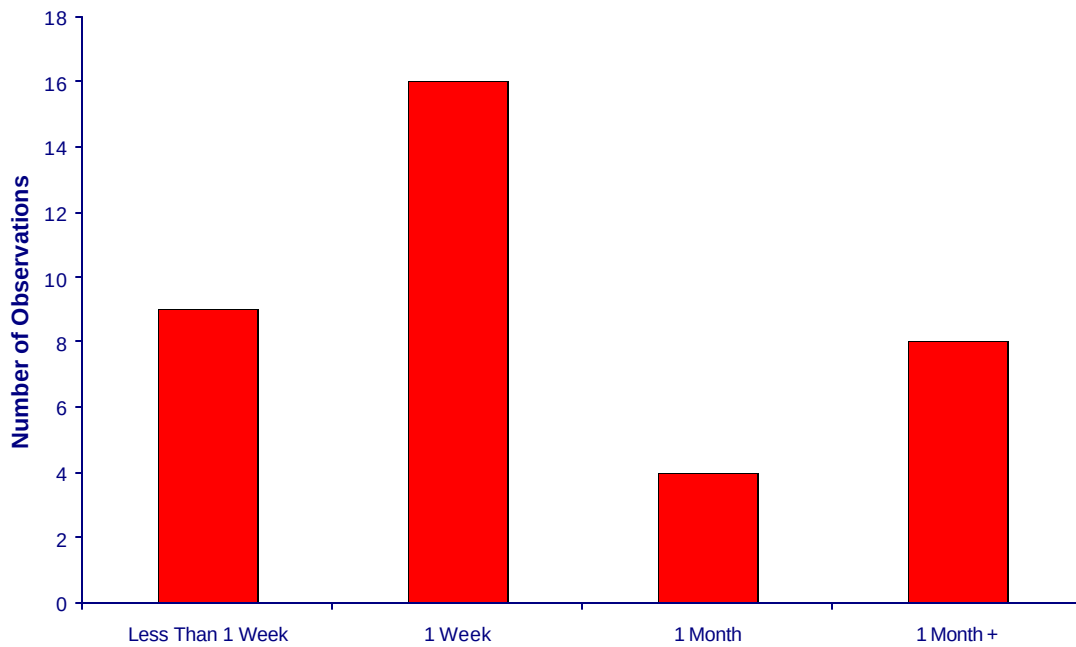
22. Who determines tract allocation procedures?

**Who Determines Tract Allocation Procedures**



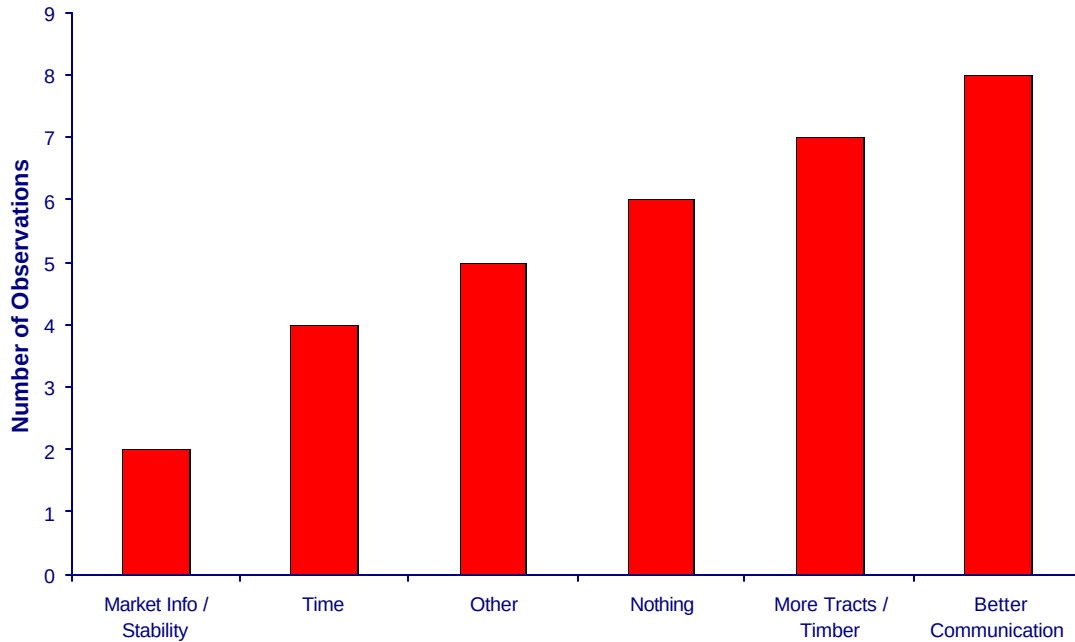
23. How much lead-time does a logger get when a tract is allocated to him?

**Amount of Lead Time Given to Logger Between Tracts**



24. What could be done to improve your current tract allocation system?

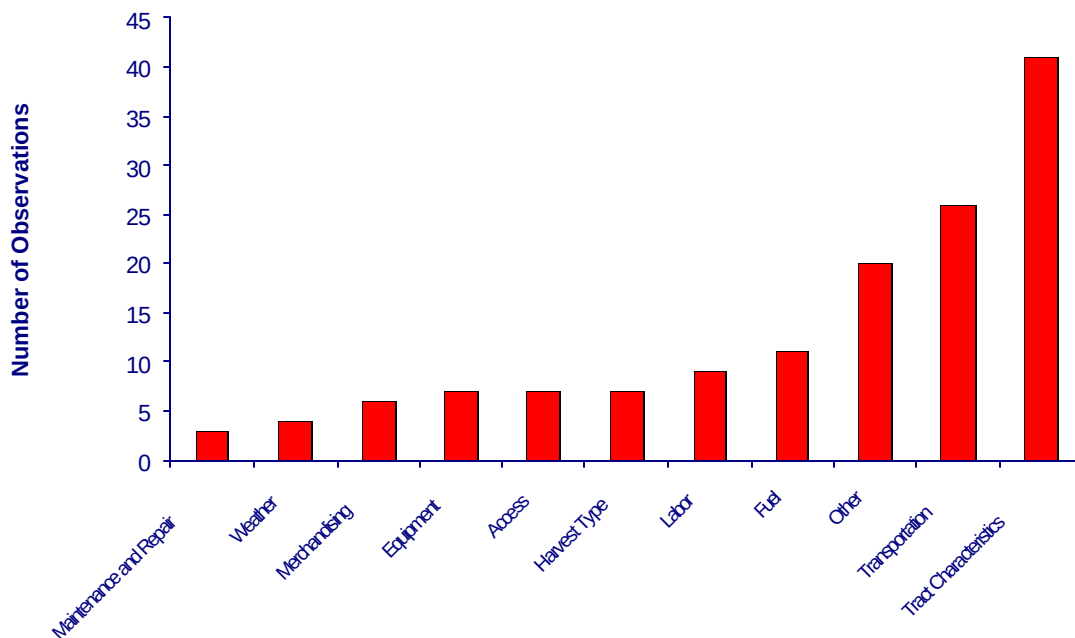
#### Areas of Improvement for Allocation



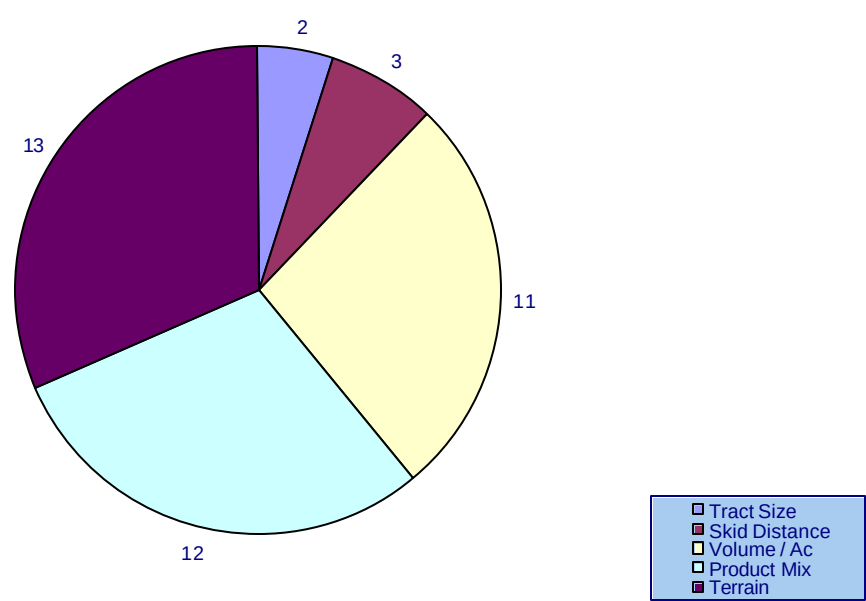
### PURCHASING

25. What are the major factors that affect the actual logging cost of your producers/ loggers?

#### Major Factors That Affect Logging Cost

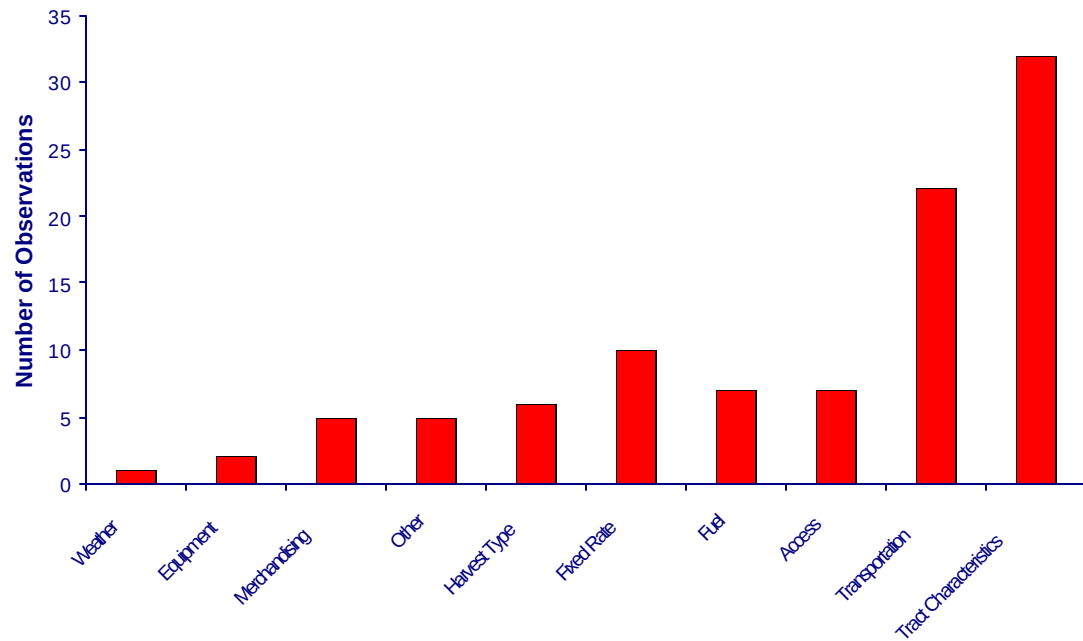


Major Tract Characteristics Responsible for Logging Cost

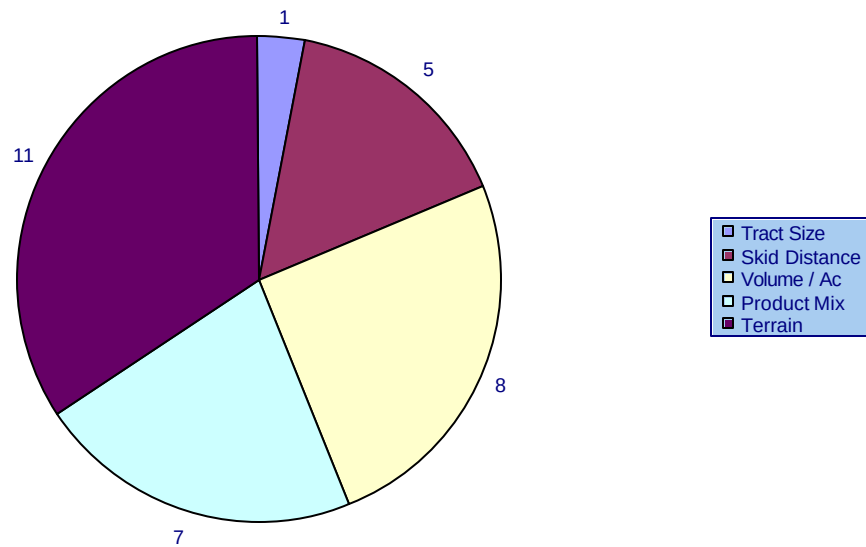


26. Which of these factors are included in the negotiations to determine the cut and haul rate for a given tract?

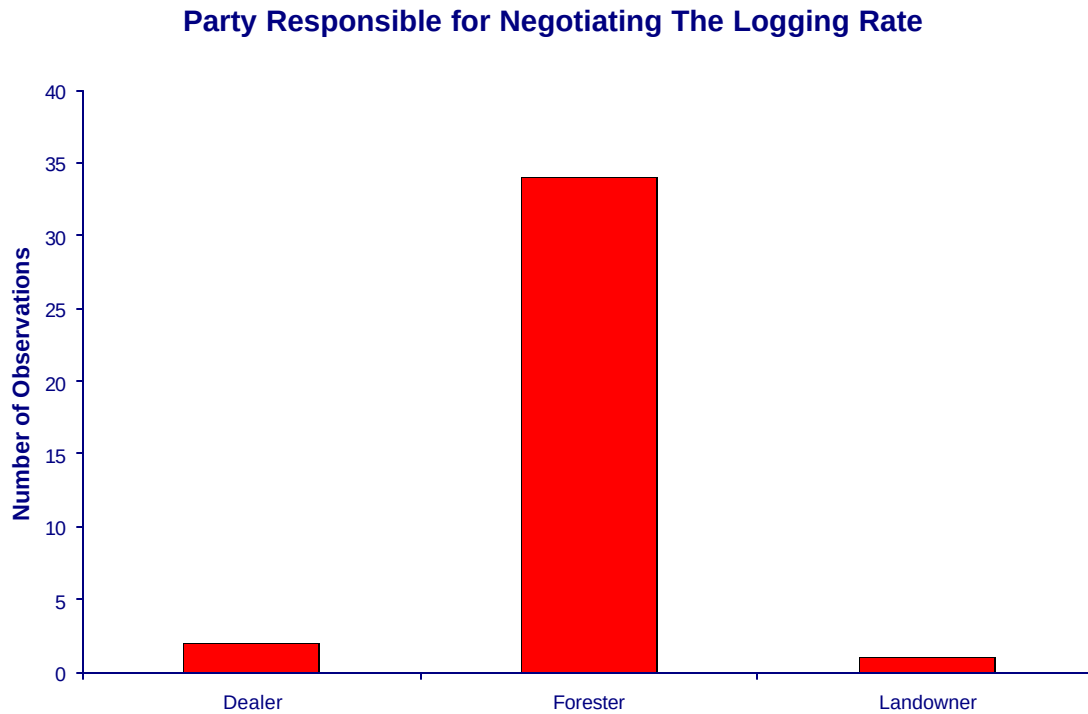
**Factors Included in Compensation Negotiations**



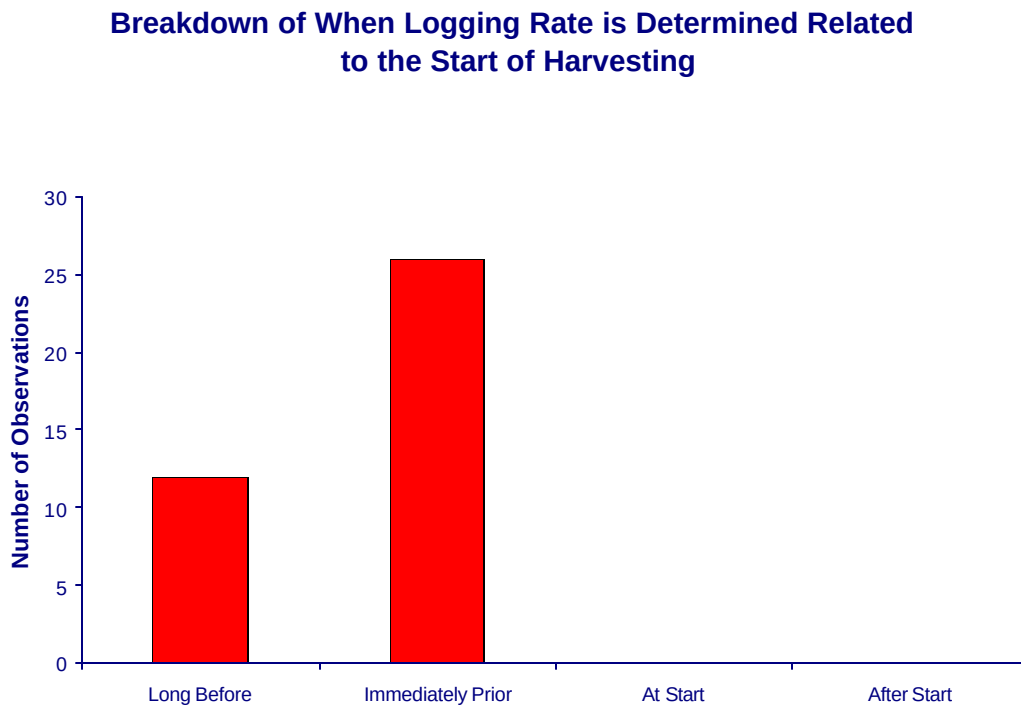
**Tract Characteristics Negotiated for Compensation**



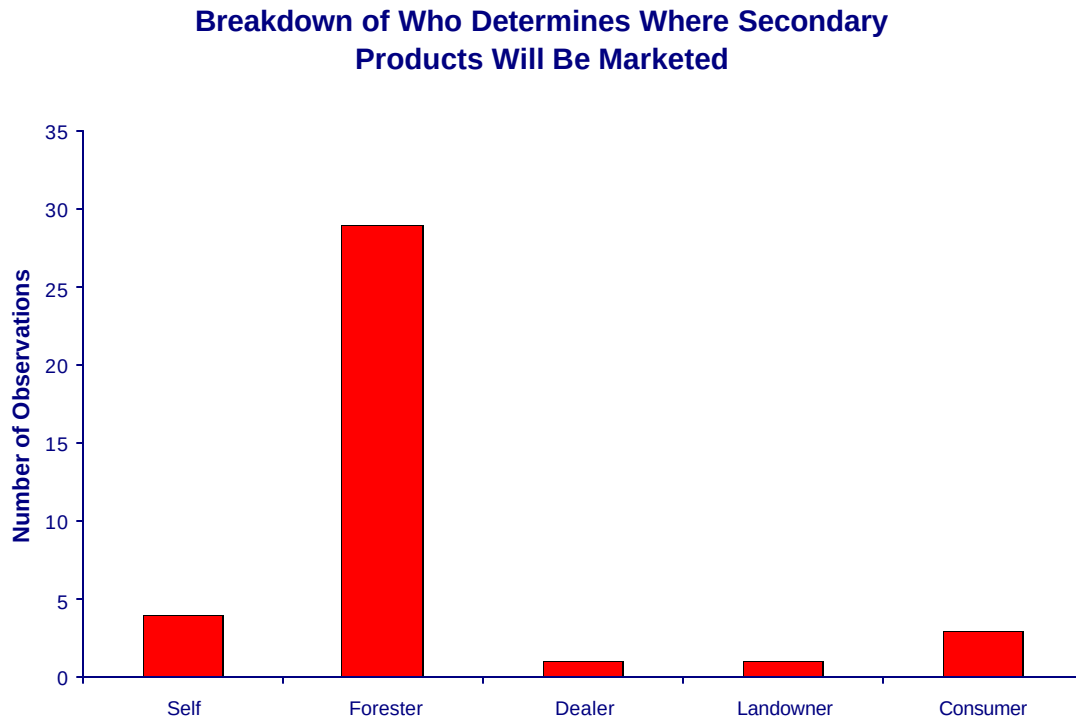
27. Who is responsible for negotiating the logging rate?



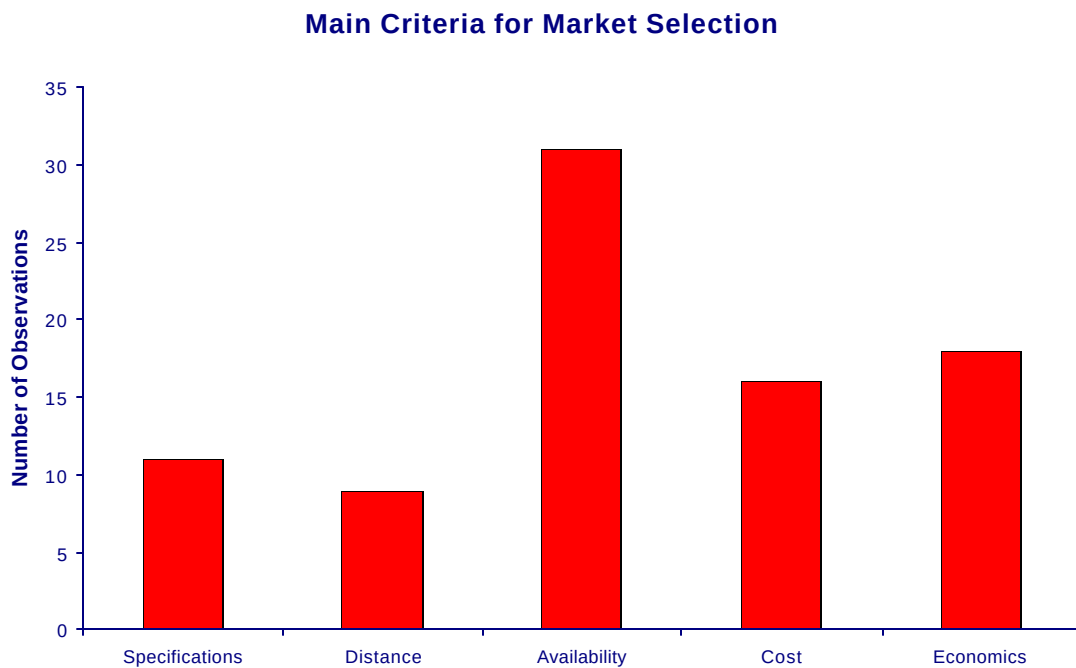
28. When is the cut and haul rate negotiated for a given tract?

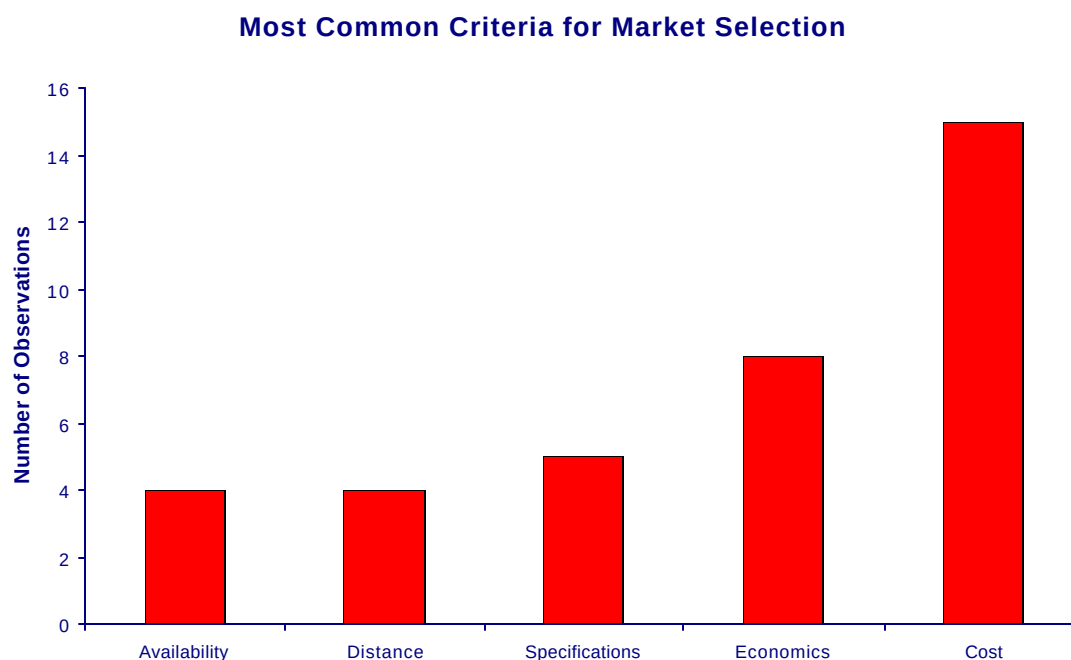


29. Who determines how and where secondary products (i.e. peelers) will be marketed?



30. How are secondary markets selected?

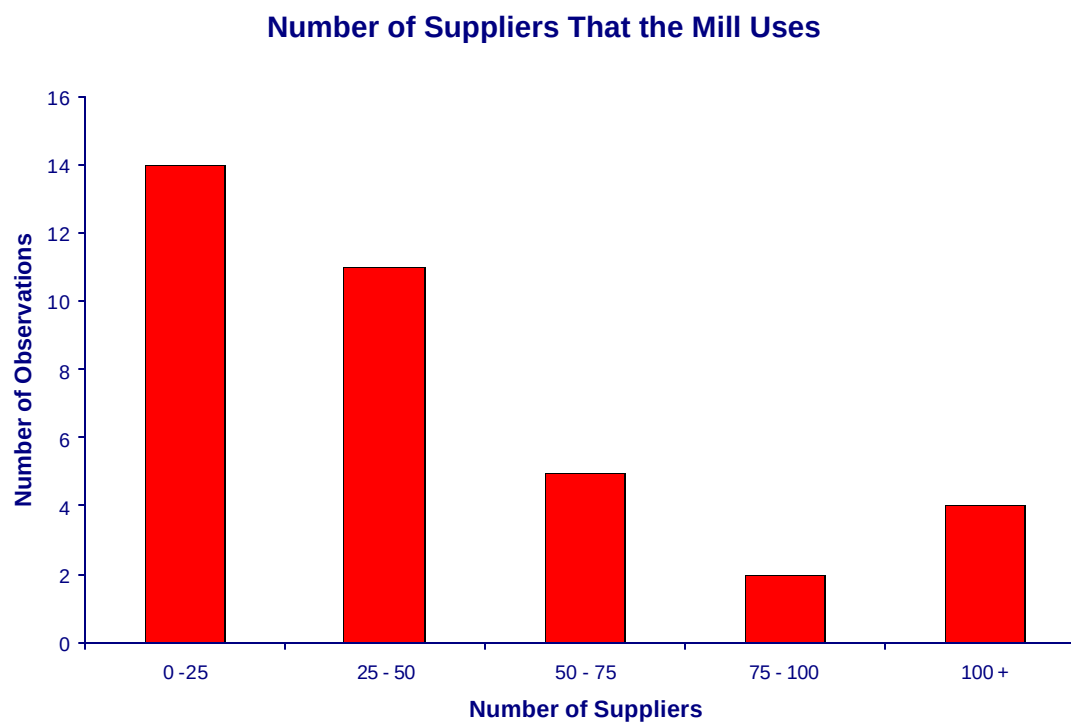




## SUPPLIERS

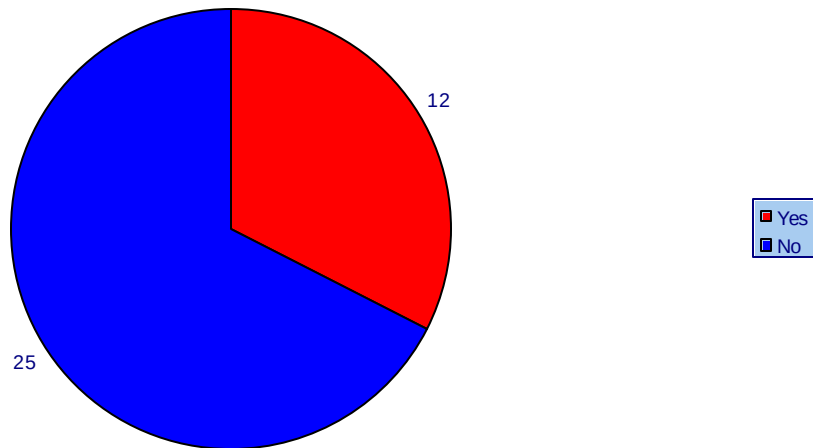
31. How does your company / mill choose its suppliers (loggers/dealers)?

32. How many suppliers does your mill currently use?



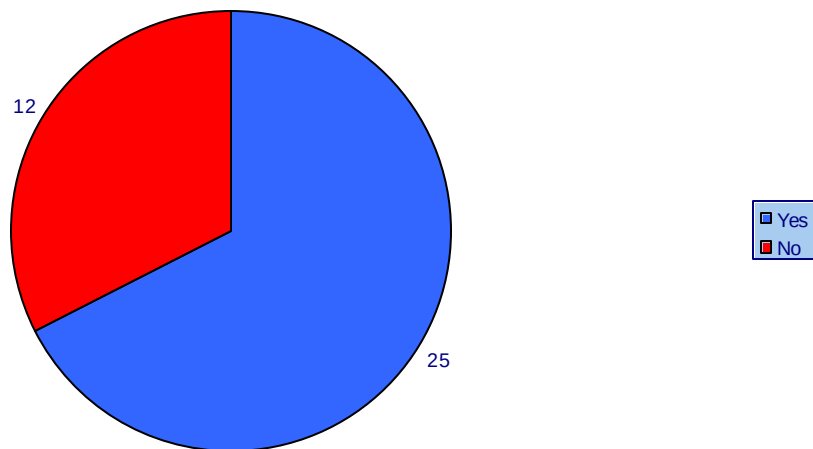
33. Could the mill use less suppliers than what it is currently? Why aren't they?

**Could Mill Use Less Suppliers Than What it Currently Employed**

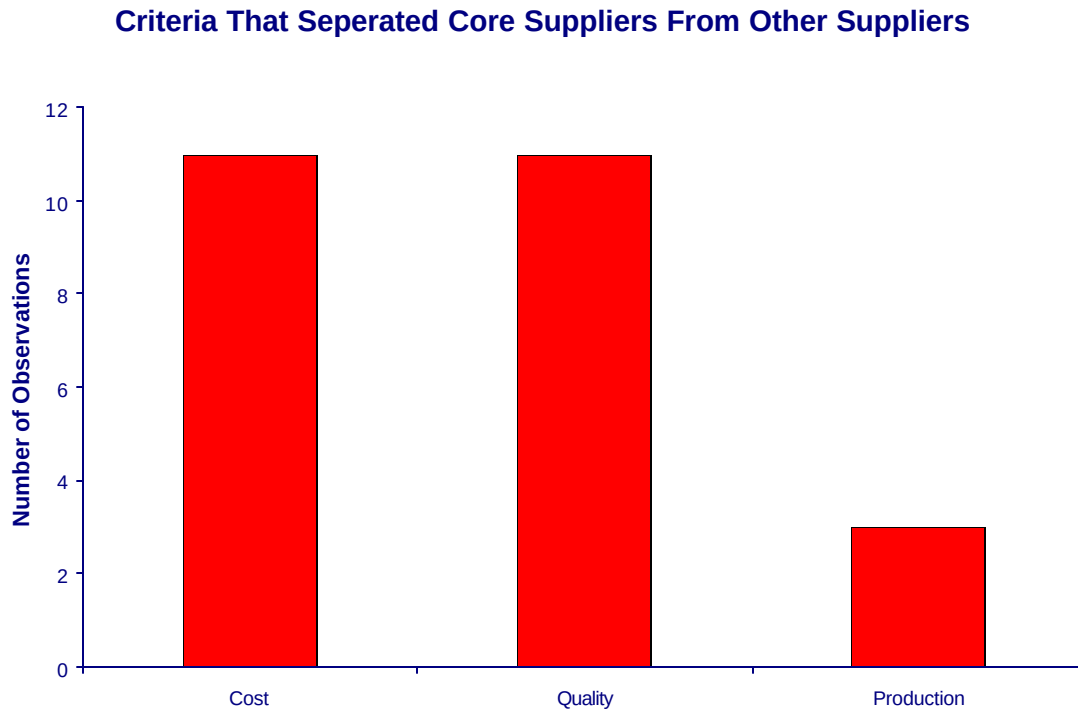


34. Does this company / mill operate a preferred / core supplier system?

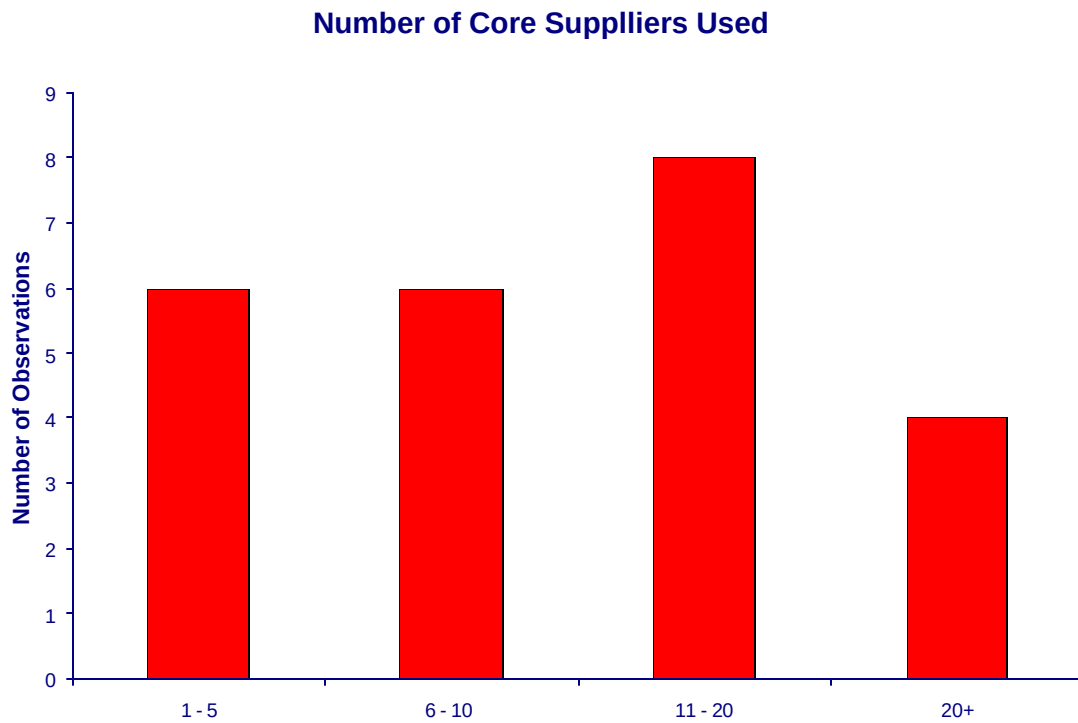
**Breakdown of Consumers Interviewed That Operated a Core Supplier System**



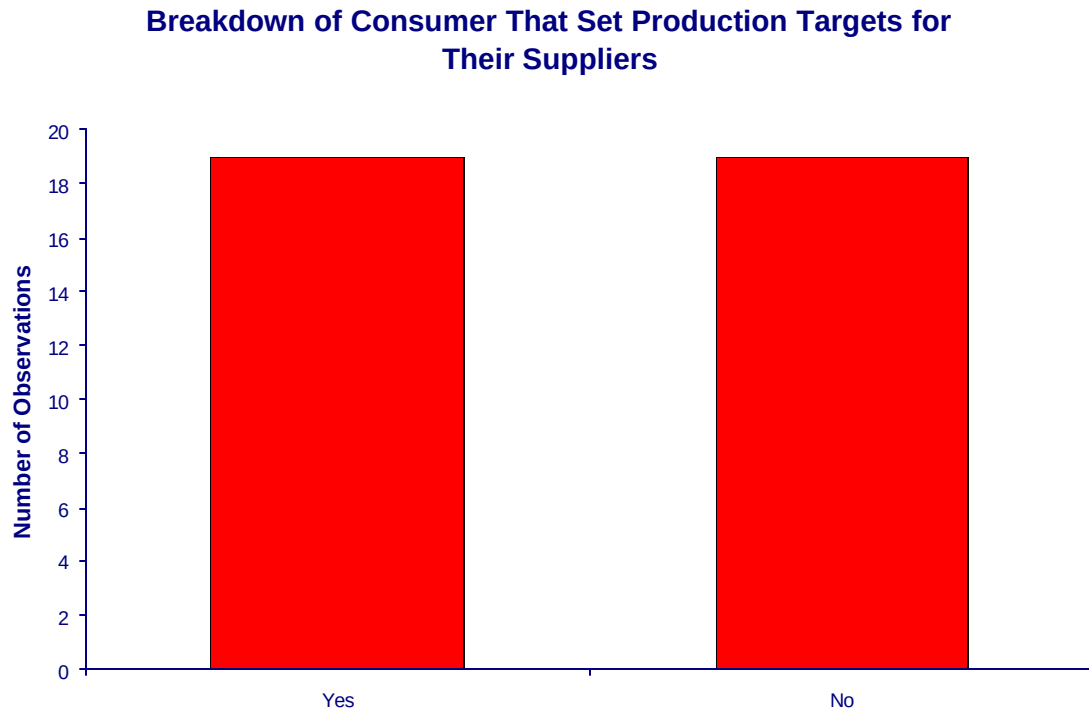
35. What differentiates a preferred / core supplier from another supplier?



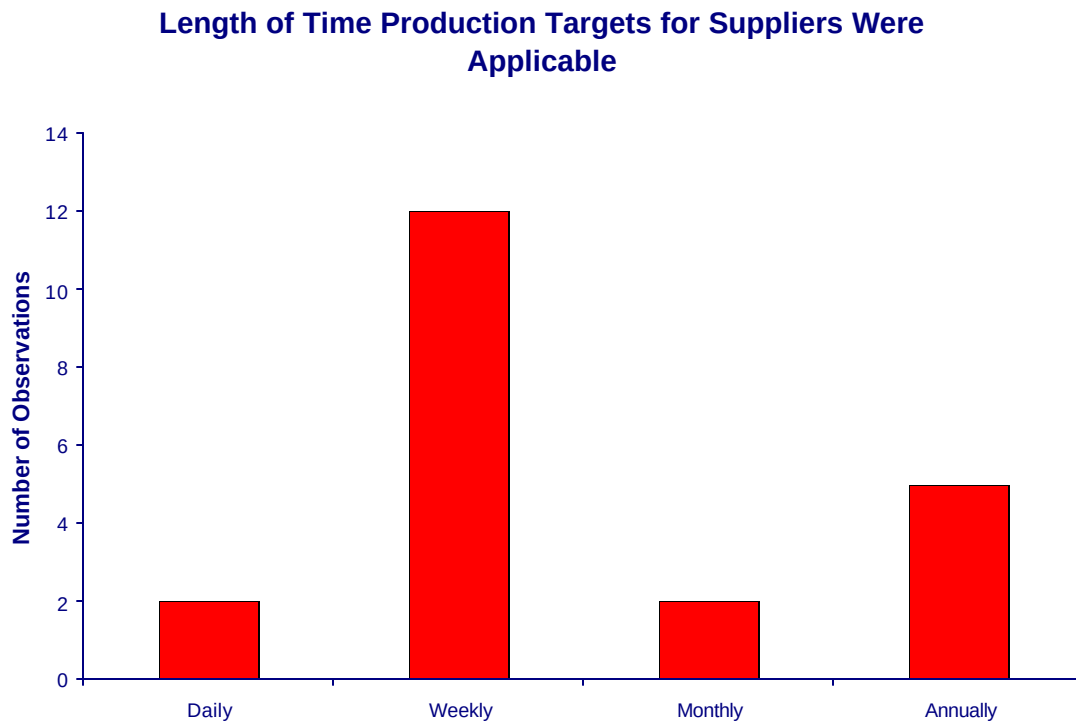
36. How many preferred / core suppliers does the mill have?



37. Do you help set production targets for your suppliers?



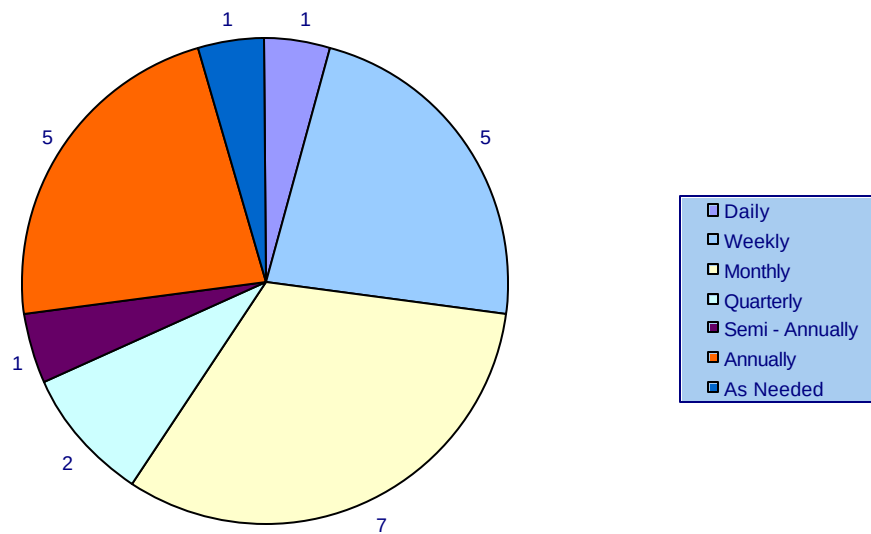
38. If yes, what is the time frame for these target?



39. If no, why not?

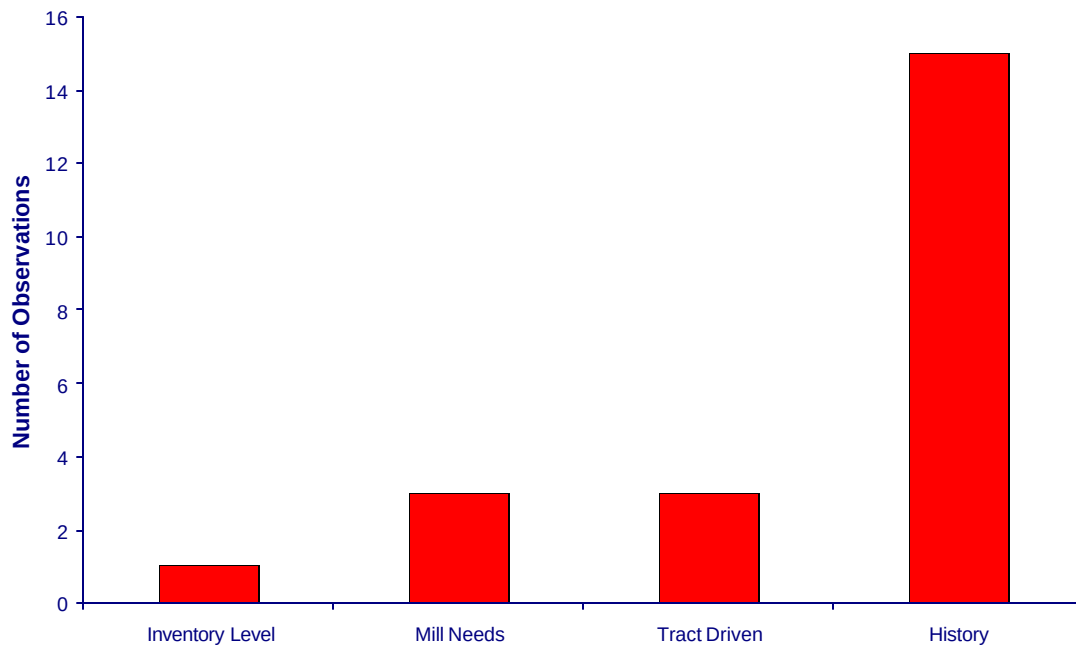
40. How often are the targets evaluated?

**Breakdown of Evaluation of Production Targets**



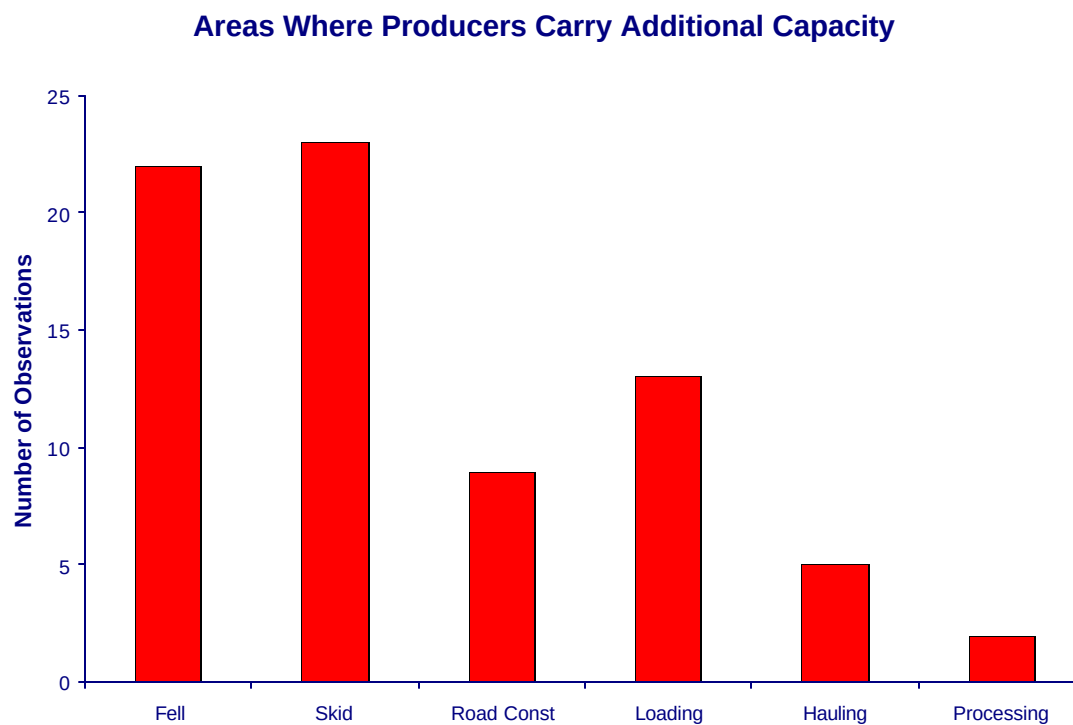
41. What information is used to determine the production targets?

**Information Used to Determine Production Targets**

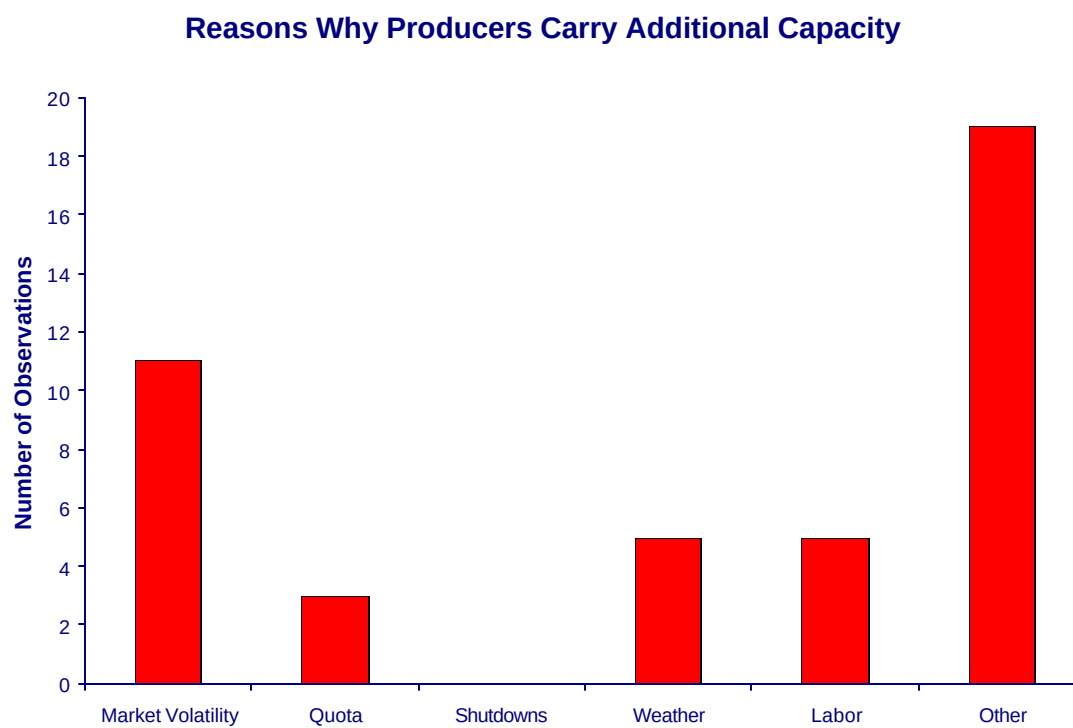


## LOGGING

42. In what areas do logging contractors in your region carry additional capacity?

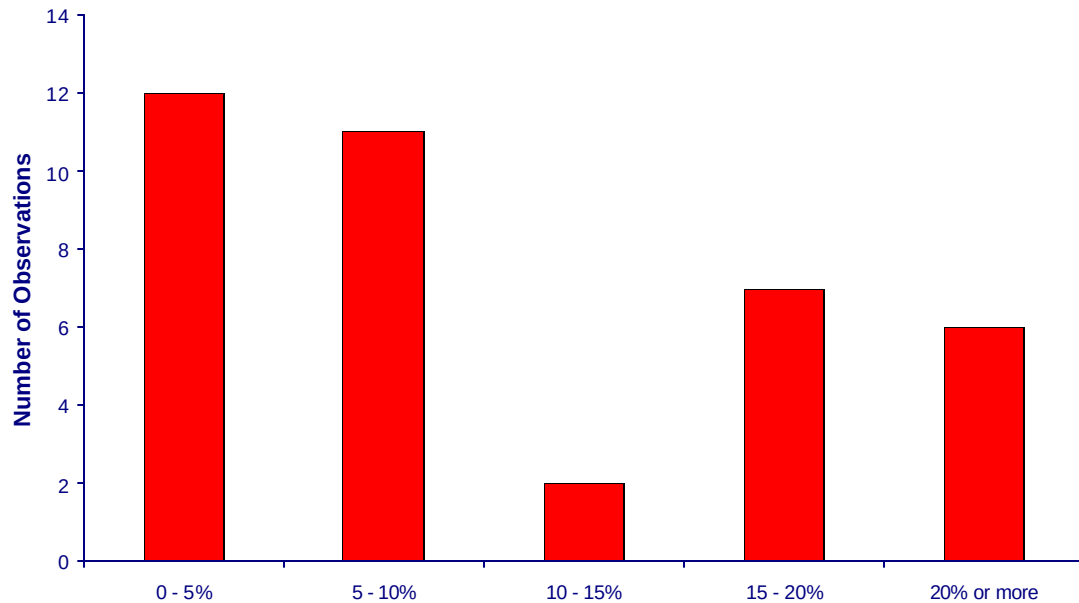


43. Why do logging contractors carry additional capacity?



44. What percentage of the time is the harvesting system not well suited to the tract that is being harvested (i.e. mismatched)?

**Breakdown of Percent of Time the Harvesting System is Not Matched to the Timber Being Harvested**



45. How many different types of logging systems are within the procurement area for this mill, what is the operability and what are the limiting factors of each?
46. For what other systems do you see a need for in your area?
47. What advantage would this 'other' system capture?
48. What do you personally think could be done in terms of planning and communication to make your job easier?

## Vita

### Personal History

Brian F. Rodgers

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Blacksburg, VA 24060

Phone (540) 951-2652

Email: [brrodger@vt.edu](mailto:brrodger@vt.edu)

Permanent Address: PO Box 34

Ronceverte, WV 24970

Phone (304) 647-4408

### Education

2001- present                      Virginia Tech University                      Blacksburg, VA

Masters of Science – Industrial Forest Operations:

***Opportunities to Increase Productivity of the Industrial Wood Supply System Through Improved Planning and Communications***

1992 - 1994                      West Virginia University                      Morgantown, WV

Bachelor of Science - Forest Resource Management

1989 - 1991                      Potomac State College                      Keyser, WV

Pre-Forestry

### Professional Positions

2001 – Present                      Virginia Tech University                      Blacksburg, VA

Graduate Assistant

Performed research project concentrated on planning and communication in the forest industry. Responsible for project management including study design, data collection techniques, data analysis and reporting.

1997 – 2000                      Westvaco Corporation                      Rupert, WV

Research Specialist

Gathered information related to timber harvesting in the Appalachian Region. Interacted with logging contractors cooperating with research project. Performed field studies of active harvesting operations. Compiled and summarized cost, production, utilization and profit information. Assisted in the identification and testing of alternative methods and processes.

1995 – 1996                      Westvaco Corporation                      Rupert, WV

Inventory Technician

Used map, compass, and pacing techniques to orient and identify boundary locations. Utilized global positioning technology to gather information for roads, tracts and inventory plots. Collected detailed stand information including location, timber type, composition, stocking, ground cover, and aspect.

1994 – 1994                      U.S.F.S.                      Steamboat Springs, CO

Resource Technician

Worked as a team member performing silvicultural and land management activities. Operated various types of forestry equipment.

### **Membership in Professional Organizations**

Council on Forest Engineering  
West Virginia Forestry Association  
West Virginia Loggers Safety Initiative  
West Virginia Registered Forester

### **Professional Activities**

Member of program committee, West Virginia Logger Safety Initiative, 1999-2000  
Chapter President, Society of American Foresters – WVU Chapter, 1993-1994

### **Computer Skills**

Experienced in the use of: ESRI Arcview, Truckbase Tracs, Timber Trakker, Truck Trakker, Microsoft Word, Microsoft Excel